

NOV 17 1937

THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS



Regulation of the Handset Telephone

FLOYD R. SIMPSON

Homestead Tax Exemption

R. E. CARLSON

Electricity Consumption and Purchasing Power

W. J. CROWLEY and C. H. BAILY

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Rate-Schedule Complexities

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Zoning for Open Space

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Definition of Navigable Waters

LESTER V. PLUM

VOLUME XIII, NUMBER 4

NOVEMBER, 1937

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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

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PUBLISHED QUARTERLY BY NORTHWESTERN UNIVERSITY

Publication office: 450 Ahnaip St., Menasha, Wis.

Editorial and General offices: Northwestern University, School of Commerce, 337 East Chicago Ave., Chicago, Ill.
The contents of the *Journal* are indexed in the *Industrial Arts Index*.

Entered as second-class matter, January 5, 1925, at the post-office at Madison, Wis., under the Act of Congress of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized October 12, 1922. Application has been made for transfer of second

class entry to Menasha, Wis. Printed in the United States of America.

Subscription Rates: \$5 a year; \$1.25 a copy. Remittances may be made by personal checks, drafts, post-office or express money orders, payable to the Journal of Land & Public Utility Economics.

Agents of the *Journal* in Great

Britain, B. F. Stevens & Brown, Ltd., 28-30 Little Russell St., British Museum, London, W. C. 1.

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HELEN C. MONCHOW, *Managing Editor*.

The contributors to this number include:

Floyd R. Simpson, Assistant in Economics, School of Business Administration, University of Minnesota.

R. E. Carlson, former Graduate Student, Northwestern University.

W. J. Crowley, Assistant in Office of Vice President in Charge of Operations, Public Service Company of Northern Illinois; Lecturer in Public Utilities, Northwestern University.

C. H. Baily, Rate Analyst, Public Service Company of Northern Illinois.

R. R. Renne, Head of the Department of Economics and Sociology, Montana State College and Agricultural Economist, Montana Agricultural Experiment Station.

H. H. Lord, Research Assistant, Montana Agricultural Experiment Station and Assistant State Supervisor of Rural Research, Division of Finance, Research, and Statistics, Federal Works Progress Administration.

H. H. Martin, Jr., Rate Engineer, Federal Power Commission, San Francisco.

Herbert S. Swan, City Planner, New York City.

George W. Tuttle, City Planner, New York City.

Lester V. Plum, Instructor in Economics, Princeton University.

Robert G. Dudley, Junior Statistician, Public Service Commission of Wisconsin.

Julius Fleischmann, Doctor of Political Economy, University of Freiburg.

Coleman Woodbury, Director, National Association of Housing Officials.

Helen C. Monchow, of the *Journal* staff.

James H. Marshall, Associate Agricultural Economist, Farm Security Administration, United States Department of Agriculture.

E. H. Teagarden, District Agent, Extension Service, Kansas State College.

H. M. Olmsted, Consulting Engineer, Illinois Commerce Commission.

E. D. Ostrander, Supervisor, Section of Rates and Research, Illinois Commerce Commission.

Barclay J. Sickler, Chief Statistician, Public Service Commission of Wisconsin.

A. L. Stein, Assistant Counsel, Illinois Commerce Commission.

Charles S. Ascher, Secretary, Committee on Public Administration, Social Science Research Council.

Carrie Maude Jones, Librarian, National Association of Real Estate Boards.

Frederick S. Deibler, Professor of Economics, Northwestern University.

D. L. Marlett, Assistant to Executive Officer, Illinois Commerce Commission.

Harold M. Groves, Professor of Economics, University of Wisconsin.

Simeon E. Leland, Professor of Economics, University of Chicago.

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of the New School for Social Research, New York

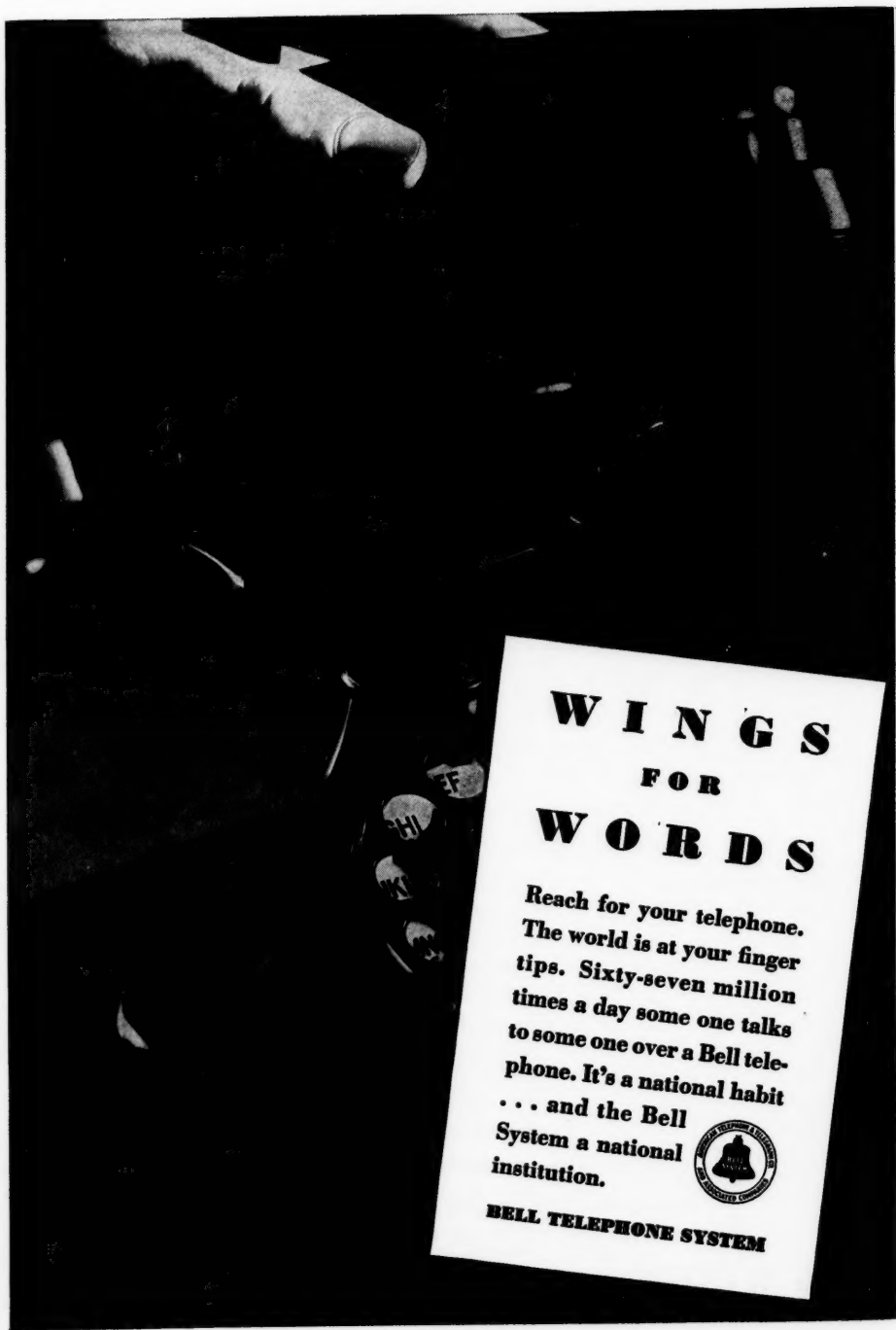
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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

NOVEMBER
1937



VOLUME XIII
NUMBER 4

The Handset Telephone: A Problem in Public Utility Regulation

By FLOYD R. SIMPSON*

THE introduction of the handset telephone in the United States has given rise to a regulatory problem in respect to what constitutes adequate subscriber equipment for the rendering of telephone service, and what charges are to be made to subscribers for that equipment. The latter aspect of the problem especially has received much attention from regulatory bodies during the past nine years.

The handset telephone,¹ although relatively new to a majority of Americans, actually has a history of development covering a period of over 50 years. The inconvenience encountered in using the original telephone invented by Bell in

1876 stimulated endeavors to improve the instrument. In 1877 several crudely constructed devices, resembling the handset in principle, were patented in England, but they were never used commercially.² In 1878 an experimental model of a handset was made in America and used on the central office switchboard of the Gold and Stock Telegraph Company of New York. This instrument was taken to France in 1879, and after improvements were made it came to be widely used there. A further development of the handset followed in the Scandinavian countries in 1884, and a few years later its use spread into Belgium, Germany, and England. The Ericsson Telephone Manufacturing Company of Sweden made and sold over 2,000,000 sets before general adoption in America began.³

* Assistant in Economics, School of Business Administration, University of Minnesota.

¹ The type of instrument we are discussing consists of a transmitter and receiver joined together on opposite ends of a common handle. It has been described and designated by many names and trade-names, such as "French phone," cradle phone, hand cradle set, hand-mike, hand telephone, grabaphone, handmicro telephone, micro telephone, monophone, monotype set, and neophone. One subscriber in Vermont wrote to the company requesting that they install a "hambone" telephone in her home. In this paper the term "handset" is used to cover all such equipment.

² H. A. Frederick, "Early Handsets," *Bell Laboratories Record*, July, 1934. This article contains a historical outline of these early sets and is well illustrated.

³ Information furnished by the Ericsson Telephone Manufacturing Company. The following tabulation shows the Ericsson production bi-annually up to 1924:

(Footnote 3 continued on page 332)

The Growth of Demand

In the United States the handset was not made generally available to subscribers until 1927. However, foreign manufacturers, such as Ericsson, began shipping a few instruments to the United States as early as 1896, and small American companies began producing them after 1900.⁴ These sets were sold to private buyers and to numerous telephone companies which sprang up following expiration of the Bell patents in 1893 and 1895. The Ericsson company operated a factory branch in Buffalo, New York from 1907 to 1915, during which time they sold about 15,000 handsets.

During the years from the turn of the century to 1927 the demand for a convenient type of instrument, such as the handset, was constantly growing. The Essex Hotel in New York was using the handset in all its rooms as early as 1901.⁵ The United States Army Signal Corps in 1906 gave an order for 500 portable handsets.⁶ One manufacturer, in an endeavor to meet a growing demand for greater convenience, went so far as to construct devices for holding the receiver of a desk-model phone when a conversation was in progress.⁷ Portable handsets were used for many years by

telephone men in field work, and by railroad companies for train despatching.⁸

Before the large American telephone companies made handset instruments available, some subscribers even went so far as to buy their own handsets and attach them to the lines of the company from which they received service. As a result of this practice one company ran notices in the newspapers directing attention to a clause in the subscriber's contract which prohibited use or attachment of any apparatus to company lines unless it was furnished by the company itself.⁹ The New York Telephone Company had several hundred orders for handset service on file even before it was officially offered.¹⁰ The strength of the demand was well evidenced in Milwaukee in 1928, when a threatened withdrawal of all handset service recently begun by the Bell company, was met with bitter opposition.¹¹ In a Pennsylvania hearing in 1933 the telephone company stated that handsets were offered in response to a popular demand forced on the company.¹² Lastly, what better evidence have we of the desire of subscribers for an improved telephone instrument than the great number of handsets installed after 1929, in spite of the deterrent of a substantial monthly charge and a change-of-instrument fee, the reduced incomes brought about by the depression, and an otherwise general loss of stations by all telephone companies?

The large American telephone companies were aware of the widespread usage abroad and the growing demand at home, but they appear to have been unhurried about making handsets avail-

(Footnote 3 continued from page 331)

Year	Number	Year	Number
1891-2	1,230	1909-10	112,164
1893-4	9,192	1911-12	145,528
1895-6	30,940	1913-14	151,104
1897-8	80,157	1915-16	201,059
1899-00	106,191	1917-18	206,362
1901-2	113,504	1919-20	137,869
1903-4	146,815	1921-22	99,565
1905-6	169,699	1923-24	90,644
1907-8	125,153		
		Total	1,927,176

⁴ A general survey of early American telephone journals revealed at least 11 such companies operating from 1902 to 1906.

⁵ 28 *Western Electrician* 207 (March 23, 1901).

⁶ 11 *Telephony* 325 (May, 1906).

⁷ 17 *Telephone Magazine* 287 (May, 1901).

⁸ *Re Ohio Bell Tel. Co.*, P.U.R. 1933 C 338 (340); 8 *Telegraph Age* 285 (April 16, 1909).

⁹ 92 *Telephony* 20 (March 12, 1927).

¹⁰ *Ibid.*

¹¹ 94 *Telephony* 46 (March 3, 1928).

¹² *Pub. Serv. Com. of Pa. v. Bell Tel. Co. of Pa.*, P.U.R. 1933 B 343.

able on their own lines. The Bell organization made up several hundred handsets in 1905 but withdrew them because of unsatisfactory performance.¹³ For a number of years thereafter, this organization apparently did little to bring out an improved instrument. In 1914, however, under the leadership of President Theodore N. Vail a change in policy brought about renewed endeavors in this direction, culminating in the development of the present handset.

Reasons for Later Adoption

The arguments most frequently presented by the large telephone companies for not offering this more convenient service sooner are as follows: (1) foreign manufactured sets would not give the high quality of service of American Bell-made apparatus; (2) the positional effect caused by moving the handset while in use made the set noisy and brought about undesirable variations in the circuit to the central office; (3) picking up and laying down the set caused aging and breakage; (4) howling noises were often set up in the older style handsets as a result of acoustical coupling between transmitter and receiver (similar to the howl that is sometimes heard when the receiver of a desk or wall type set is held close to the transmitter); (5) the impossibility of altering the distance between the transmitter and the receiver often caused transmission loss or distortion, because of physical differences in individuals using the phone.

References made to the works of several technical writers in the field and a personal discussion with a communica-

tions engineer suggest some sound basis for these arguments during the early period. Kempster B. Miller¹⁴ states that American companies did not wish to sacrifice transmission efficiency for convenience, but he further remarks that there has "probably been some inertia on the part of American manufacturers and operators about striking at the root of the question and curing defects. . . ." Mr. Miller sees the handset as giving *increased* transmission output because the speaker's lips are in a more nearly correct relationship with the mouthpiece. A. V. Abbott, writing in 1904,¹⁵ stated that "American makers could learn many profitable lessons from European models [of handsets]." A European manufacturer and a former German utility executive both inform the writer that the defects of the early foreign handsets were not important after the middle of the first decade of this century. Because of the interchange of technical knowledge between American and foreign firms there is no doubt that such improvements as were made abroad were known to American producers.¹⁶ This evidence leads to the conclusion that the

¹⁴ *Telephone Theory and Practice* (New York: McGraw-Hill Co., 1933), Vol. II, pp. 45-47.

¹⁵ *Telephony* (New York: McGraw Pub. Co., 1904), Part V, p. 442.

¹⁶ Karl Hersen, a technical adviser to the German Telegraph Department, writing in 1924, asserted that the American "solid-back transmitter is not used extensively in Europe, the hand microtelephone being preferred in Scandinavia, Germany, and many other European countries. It is therefore improbable that the cumbersome American candlestick pattern [desk set] can successfully compete with the hand microtelephone set. . . . Trials made by the German Telegraph Department with the solid-back transmitter have shown that this transmitter does not suit our conditions even if its good character as regards constancy and clearness of speech be appreciated. Consequently other transmitters, considerably more sensitive, have been designed in countries not using the solid-back. The results obtained by speaking on long distance telephone lines have shown that these transmitters are as efficient as American transmitters. . . ." (Reprinted in the *L. M. Ericsson Review*, September, 1924.)

¹³ *In re Handset Charges in the State of Minnesota*, M-2247. (Taken from the full hearings made available to the writer by the Minnesota Railroad & Warehouse Commission.)

A contrary view is expressed by engineers for the FCC, who claim that this handset was as efficient as the desk set which was used until 1927. (FCC, Eng. Dept., Spec. Inves., Docket No. 1, p. 15.)

serious defects of the handset had mostly disappeared some years before it was offered to American users.

Technical reasons were not the only ones which may have caused delay in handset adoption. The large American companies naturally did not wish to render obsolete a great mass of equipment, representing a large investment previously made, by a general installation of new style instruments. It is the writer's opinion that the non-competitive status of the industry also was an important factor. Competition is known to be the sharpest spur to improvements when the buying public desires them, whereas monopolies do not operate under such an incentive in order to hold their customers. The changed attitude on the part of the railroad companies toward speedier and more comfortable trains the last few years is a case in point. The telephone industry, unlike the railroads, is largely dominated by one central holding and operating company, and this company appears to release advances in the telephone art at its own pleasure.

Under a regulated system, what constitutes an adequate standard of service relative to the type of equipment a company should furnish subscribers? Most of the state commissions have power to make rules concerning the quality of service, but few commissions have prescribed detailed standards of equipment for telephone companies. The Bureau of Standards in 1921¹⁷ recommended that a standard be set for telephone companies in order to bring about better service. Illinois and Wisconsin set up certain minimum standards, and among other things the Illinois order stated that "... the general satisfaction of the majority of the

users is the most important criterion of good service."¹⁸ Although no provision was here made for the type of subscriber telephones, under this general provision the furnishing of handsets would become necessary when a large group of any class of subscribers desired them. The telephone companies have usually claimed that a handset does not improve speech transmission and gives no better service than a desk set.¹⁹ The Wisconsin Commission took note of this situation in 1928, when it said:

"As far as the transmission of speech is concerned there is no doubt that the wall type set would furnish reasonably adequate service, but it is the Commission's opinion that the efficient transmission of speech in and of itself does not constitute reasonably adequate service; that the convenience of the subscriber and the adaptability of the type of set to his use is also to be considered."²⁰

The Oklahoma Commission has also said that the handset cannot be classed as a luxury.²¹ For the majority of people the handset makes the telephone a more convenient instrument to use and in the writer's opinion was past due as an improvement in telephone art, even though it was offered to subscribers only upon payment of an extra charge.

Early Charges and Later Reductions

The additional charge for the handset telephone was not new in America when the larger companies began supplying it. A survey of early literature and commission orders shows that even in the early part of the century many of the small companies furnishing handsets commonly made an additional

¹⁷ General Order No. 107.

¹⁸ *Pub. Serv. Com. v. Bell Tel. Co.*, P.U.R. 1933 B 342 at 343.

¹⁹ *Re Wis. Tel. Co.*, P.U.R. 1928 E 207 (Abstract).

²¹ *Re Handset Charges by Southwestern Bell Tel. Co.*, 3 P.U.R. (N.S.) 555 (1933) (Abstract).

¹⁷ Standards for Telephone Service, Bureau of Standards, Circular 112, 1921.

charge of 25¢ to 50¢ a month for them.²² The price paid for a telephone set in those days varied very little between the desk style and the handset style. The former L. M. Ericsson Manufacturing Company of Buffalo charged \$9.00 for the "hand microtelephone" without condenser or bells, while the desk type was listed at \$8.50.

In European countries using the handset prior to 1927, the extra charge was not generally levied. This may be accounted for in part by the fact that the hand type was very early introduced into the foreign systems and therefore did not render obsolete an immense amount of equipment representing a heavy investment previously made; secondly, many of the European systems are government owned and operated and did not use the handset to increase revenues.

Since very few American subscribers could obtain handsets prior to 1927, the problem of additional charges did not arise until after that time. Introductory rates for handset service were set at 50¢ per month in all states served except Florida and Ohio.²³ In addition to the monthly rate, a flat charge ranging from \$1.00 to \$3.00 was made for changing the instrument from the old style desk set or the wall set. These comparatively high charges soon provoked complaints and investigations. On January 25, 1928 the Illinois Commission issued an order reducing the charge to 25¢ a month; Wisconsin followed only a few weeks later with a similar reduction. In the hearings the companies tried to justify the charge by showing that certain additional costs and expenses were involved in supplying the service.

The costs and expenses which the companies endeavor to set forth may be

classified as follows: (1) greater investment cost in handsets purchased; (2) increased maintenance expense; (3) increased accounting, administration, and taxation expenses. As an example, we may take the early hearings held in Illinois and Wisconsin and briefly tabulate the additional costs and expenses set forth by the companies:²⁴

Item	Illinois Bell Telephone Co.	Wisconsin Telephone Co.
Additional maintenance.....	\$1.20	\$1.80
Additional depreciation.....	1.10	3.26
Additional administration.....	.30	.50
Additional interest on added investment at 8%.....	.64	.70
Additional taxes, uncollectable revenue, & miscellaneous.....	.93	1.07
Total additional cost a year...	\$4.17	\$7.33

Commenting on these figures, the Wisconsin Commission said (February, 1928) that they were not convincing; that it was impossible for an instrument having not over a total of \$8.76 additional original cost to have an annual additional cost of \$7.33; that additional maintenance and administration costs were purely estimates, and concluded that such figures were not entitled to very great weight. The Illinois Commission held there was little to show why the maintenance should be greater than that encountered with the desk set, and cut the charge from \$1.20 to 60¢ a year; it also cut depreciation and administration allowances in half.

Other states rapidly followed the example of these early commission decisions, and during 1928 and 1929 there was a wave of voluntary company reductions and commission orders in all parts of the country. Only nine states

²² For example, see 8 *Telephony* 15 (July, 1904).

²³ FCC, Eng. Dept., Spec. Inves., Docket No. 1 (Dec. 14, 1936), p. 8.

²⁴ *Re Ill. Bell Tel. Co.*, P.U.R. 1928 C 283; *Re Wis. Tel. Co.*, P.U.R. 1928 E 207 (Abstract). For more details of the Wisconsin case, see 192 *A. T. & T. Co. Com. Leaflets* 845.

had not obtained a rate of 25¢ from the larger companies by the end of 1929.²⁵

The movement toward a second reduction was begun in Washington, D.C., where on May 1, 1931, after a discussion between the Chesapeake and Potomac Telephone Company and the District of Columbia Commission, a limit was set on the duration of the collection of the 25¢ charge. A limit of 18 monthly payments was made (\$4.50), or the option of paying \$4.00 in a lump sum when the service was installed.²⁶ No further reductions were made in 1931, but in 1932 the Chesapeake and Potomac instituted the same plan in Maryland and Virginia. In 1933 wholesale reductions were made affecting subscribers in 30 states. The trend of these reductions was to limit duration of the 25¢ charge to 18 to 36 months, or a lower continuous charge of 15¢ a month.

The first wave of reductions, once begun, tended to be voluntary on the part of the companies, but the second reductions, from 25¢ recurring, came about more as a result of commission activity. Although most of these were either a limitation on the 25¢ charge or a lower rate of 15¢, or both, some states secured even lower rates. In 1935 the Wisconsin Commission ordered a charge of only 8¢ a month, unlimited as to duration of collection.²⁷ In 1936 the New York Telephone Company made a reduction to 10¢ for 24 months, until January, 1938, after which time the charge will be for 18

months.²⁸ Pennsylvania and New Jersey, in 1937, have obtained a rate of only 15¢ for 12 months, and New Jersey has further ordered that there be no charge for handsets after January 1, 1938.²⁹ The New England Telephone and Telegraph Company will charge 10¢ a month for 12 months after September 1, 1937.³⁰

Difference in Revenues

When the second wave of reductions began in 1931, the uniformity of rates among the various states became less and less. The wide variation in total revenues collected from state to state, some of which are even adjacent to one another, makes it very difficult to understand how it is economically possible to have correspondingly wide variation in costs for an identical service, even though a reasonable allowance is made for differences in operating conditions. To cite a few instances, we find that the added charge collected in Virginia from January, 1928 to January, 1936 would have amounted to \$12.75, while in West Virginia, its neighbor, the charge for the identical period would have amounted to \$34.85. In Nevada \$30.00 would have been collected, while in Arizona and Colorado revenues would have totaled but \$18.50 and \$18.25 respectively. In Kentucky the charges would have been \$37.55, while in Indiana only \$17.50 would have been collected; in Delaware the amount paid would have totaled \$21.87, and yet in the District of Columbia only \$10.75 would have been billed. Granting that the cost-of-service principle ruled in 1928 and 1929, we now find a condition which appears to have taken on the aspects of charging "what the traffic will bear." The com-

²⁵ Nevada came under the 25¢ charge in 1930; West Virginia in 1932; Kentucky, Louisiana, North Carolina, South Carolina, and Tennessee in 1933; Georgia reduced the rate from 50¢ to 15¢ in 1933; Mississippi did not obtain a rate below 50¢ until 1934.

²⁶ The engineers for the FCC state that this was a compromise on the part of the Chesapeake and Potomac to avoid any possibility of having the charge eliminated entirely. (FCC, Eng. Dept., Spec. Inves., Docket No. 1, pp. 2-3.)

²⁷ *Re Charges Made for Handset Service*, 8 P.U.R. (N.S.) 282.

²⁸ 111 *Telephony* 20 (July 4, 1936).

²⁹ 112 *Telephony* 32 (Feb. 27, 1937); 112 *Telephony* 29 (Feb. 20, 1937).

³⁰ 112 *Telephony* 26 (Aug. 7, 1937).

panies, however, have maintained that additional costs only are covered in these charges.

Additional Costs Claimed

The first cost an operating company must meet in adding handsets to its system is the additional investment in the instrument itself. The price of the largest producer, the Western Electric Company,³¹ declined from \$25.25 in 1927 to \$8.89 in 1930, and was \$10.45 in 1936, an increase effected during the depression period.³² In this charge has been included an amount to amortize the developmental expenses incurred by the Bell Telephone Laboratories and the Western Electric Company. This amount has decreased from \$2.41 in 1927 to \$.40 in 1936. The total developmental costs up to the end of 1934 were \$5,569,024, and the amount recovered was estimated as \$4,761,571 up to the end of 1936.³³ In adding a piece of equipment that costs more than the investment retired, a company increases its total investment and thus seeks to recover the difference by making a charge for its amortization. This *additional* cost of a handset over a desk set has varied from \$18.61 in 1927 to \$5.36 in 1936. Since no data on manufacturing costs are as yet available, the quoted prices must be accepted for this discussion, although the Wisconsin Commission in 1935 refused to allow price increases made during the depression, on the grounds that they were not warranted when other prices were falling and some of the small manufacturers had not made increases as large.³⁴

In making an annual charge to re-

cover this additional investment, the companies have set various rates: in some states the depreciation rate for other station apparatus has been applied, while in others a higher rate was employed on the grounds that the life of a handset will be shorter than that of other types. These rates have varied from 7% to 9.5% in the various state hearings, although the A. T. & T. used only 7% for its own purposes.³⁵ A number of the state commissions reduced these charges; for example, in the New York hearing the company endeavored to apply a 7% rate to the full cost of the handset, but the Commission ruled that it could be applied only to the additional amount invested.³⁶ In the Wisconsin hearing the company claimed the position life of a handset to be only 6 years with a 50% salvage value at the end of that time, while the Commission set 6.5 years as the position life, and the salvage value as 75%.

A second extra cost occasioned by supplying handsets is the additional maintenance expense over and above that required by desk set equipment, usually attributed by the companies to the more frequent field and shop repairs. In the New York hearing field repairs were set at 34¢ a year, and an average of 36¢ a year was claimed for shop reconditioning.³⁷ In addition to these maintenance charges some companies have inserted a further charge on the grounds that these costs will increase as the percentage of handsets in the system increases and as their age increases. In New York this charge was placed at 20¢ a year by the company, making the total maintenance 90¢ a year. In other states the figures

³¹ Manufacturing subsidiary of the A. T. & T. Co.

³² FCC, Eng. Dept., Spec. Inves., Docket No. 1, Appendix IV, Sheet 3.

³³ *Ibid.*, p. 26, Appendix IV, Sheet 2.

³⁴ *Re Charges for Handset Service*, 8 P.U.R. (N.S.) 267 at 272.

³⁵ FCC, Eng. Dept., Spec. Inves., Docket No. 1, pp. 28-30.

³⁶ *City Affairs Committee v. N.Y. Tel. Co.*, P.U.R. 1933 D 448 at 458.

³⁷ *Ibid.*, p. 459.

presented have not been the same; for example, total maintenance in Michigan was set at 34¢; Georgia, 74¢; Wisconsin, 25¢; and Pennsylvania, 60¢.³⁸ These wide variations lend some credence to the view that the figures were mere estimates, or were based on an unusual amount of trouble experienced with first installations, and not typical of later experience.³⁹ According to federal engineers, the new handset being produced at the present time will have less maintenance difficulties than the desk set, and all basis for an additional charge will eventually disappear.

The third item included as a basis for additional charges is increased taxes. These are founded upon the assumptions that: (1) as additional property value is added, aggregate property taxes will increase; and (2) when revenues are increased, all taxes based thereon will rise. As to the first, there can be little controversy if handset prices are accepted, although some states have differed from the companies on the method of figuring such taxes. For example, the Georgia Commission pointed out that the tax

rate should be applied against the additional investment and not, as the company contended, against the full cost of the new equipment.⁴⁰ When the tax is based on income the amount of additional tax expense, if any, will depend entirely upon the amount of additional revenue collected. This will, of course, increase taxes based on gross revenues, but should not cause any increase in net revenue taxes because the extra charge is based upon costs to be incurred, thereby leaving nothing for net income. Claims for additional taxes have ranged from 8¢ to 85¢ a year.

The fourth basis for additional charges is founded upon added administration expenses, and commercial and accounting costs. These costs are not great and little will be said about them in this paper. One commission pointed out that if administrative expenses are not raised in total when handsets are added there is little reason to include the item in computing the additional handset charge.⁴¹ Commercial and accounting expenses are at least partially covered in the service connection charge or change of instrument fee and, if a loss is incurred on commercial and accounting costs in rendering handset service, it is also incurred on them in providing other types of instruments. Several states, such as Michigan and Minnesota, did not allow the claim.

Among the other additional expenses claimed by the companies are increased uncollectable revenues and licensee contract expense. (The latter applies to Bell companies, and is 1.5% of gross revenue paid to the A. T. & T. by the associated companies for services rendered by the parent organization.) Here again the amount of such expense depends upon

³⁸ *Re Mich. Bell Tel. Co.*, 4 P.U.R. (N.S.) 164 (1934); *Re Telephone Companies in the State of Georgia*, 3 P.U.R. (N.S.) 50 (1933); *Re Wis. Tel. Co.*, 8 P.U.R. (N.S.) 267 (1935); *Pub. Serv. Com. v. Bell Tel. Co. of Pa.*, P.U.R. 1933 B 343.

³⁹ The Engineering Department for FCC assert that the Bell Telephone Laboratories, in spite of nine years of investigation and development, released a handset in 1927 which had a major error in its construction, and that this error was first located by the British Post Office Engineering Research Station, which purchased 10 handsets in America in 1927. The errors located were "low efficiency of the receivers, and rapid deterioration of the transmitters due to penetration of condensed breath vapor." It is also asserted that the error was not immediately acknowledged by the American company. This would cause maintenance costs on early sets to be higher than upon a later improved product.

For further details see FCC, Eng. Dept., Spec. Inves., Docket No. 1, pp. 32-40 or 111 *Telephony* 22 at 27 (Dec. 23, 1936). It should be remembered that in the investigation conducted by the FCC the companies have not been given an opportunity to submit opposing evidence.

⁴⁰ *Re Telephone Companies in the State of Georgia*, 3 P.U.R. (N.S.) 50 (1933).

⁴¹ *Re Mich. Bell Tel. Co.*, 4 P.U.R. (N.S.) 164 (1934).

the other additional charges collected. In the Wisconsin hearing⁴² the Commission allowed the licensee expense but stated that the "company has not yet introduced adequate proof of the reasonableness of the license contract payments in the state-wide proceedings, or in connection with this matter [of handset charges]."

Analysis of the alleged additional cost items has shown: (1) the additional investment in the handset must be amortized over a period of years, if the supply prices are not excessive. The amount of such amortization, however, varies from state to state, between 7% and 9.5%. The A. T. & T. was found by the FCC to be using 7% for its own purposes. (2) The additional maintenance costs vary considerably from hearing to hearing, and appear to be in part merely estimates. (3) Tax expenses, when properly computed, may be justified. (4) Additional administrative, commercial, and accounting costs seemingly rest upon a doubtful foundation. (5) Uncollectable revenues and licensee contract expenses depend entirely upon the other additional charges being allowed.⁴³

⁴² *Re Wis. Tel. Co.*, 8 P.U.R. (N.S.) 267 (1935).

⁴³ The FCC engineers have taken all the costs incurred by the A. T. & T., as given to them by the company, and the revenues received from the handset, and compiled the following figures covering the period from 1918 to 1936:

Unrecovered alleged developmental expense.....	\$ 4,263,380
Depreciation of alleged added investment.....	8,490,722
Alleged added maintenance costs.....	8,948,495
Alleged added administrative costs.....	474,096
Alleged added property taxes.....	1,423,688
Total.....	\$23,600,381
Alleged revenues.....	\$53,240,933
Less alleged added costs.....	23,600,381
Profit before income tax.....	\$29,640,552
Less income tax on profits (composite rate).....	5,745,197
Net profits on handset.....	\$23,895,355

Taken from p. 51, FCC, Eng. Dept., Spec. Inves., Docket No. 1 (Dec. 14, 1936).

In addition to the above costs the companies have desired to recover in the additional charge the undepreciated value of the desk set permanently removed from service and not fully covered by previous charges to the depreciation account. This cost is certainly legitimate where such a situation is found, although the depression caused many old style sets to be retired and recovery conditions may call them back into service. Should the latter case arise, the handset user would be paying on a piece of equipment which his use of a handset had not caused to be permanently retired.⁴⁴

Other Reasons for An Additional Charge

A non-cost reason frequently advanced in state hearings for placing an extra charge on handsets is that a deterrent is necessary against too rapid adoption. This is necessary, it is asserted, (1) because the capacity for producing handsets is limited, and (2) because the companies could not justly be required to make the increased investment needed to supply new handsets to all subscribers. The first reason is a technological one and can only be examined by one in possession of all the business data of the companies. FCC engineers claim that Bell manufacturing facilities were never used to their annual capacity for handset construction. The increased investment argument has ample justification, prices of sets assumed, if we admit that depreciation charges in the past

⁴⁴ An interesting sidelight on the matter of depreciation of old style sets is the claim by the FCC that the A. T. & T., which owned all instruments used by the associated companies until just before the introduction of the handset in 1927, sold these old sets to the operating companies at an inflated price. This made the undepreciated amount to be recovered by the operating companies when handsets were installed greater than it should have been, and hence affected the additional charge for the handset. (See 110 *Telephony* 22 at 27 (May 2, 1936) for further details.)

have been merely adequate in the long run to care for retirements. The British Post Office Department, which operates the telephone system in England, is charging its users only enough to cover the undepreciated portion of old instruments retired. British subscribers now pay a lump sum of 5/0 which is considerably below the lowest charge made in the United States (June, 1937).⁴⁵ While comparisons with foreign situations are always to be discounted because of different conditions, it is interesting to note that this lower rate is possible in England even though the Post Office buys its instruments on contract from outside sources, while in the large American system the "savings" of a company-operated manufacturing unit are available.

We now turn to the adequacy of depreciation charges which telephone companies have made in the past. An unfortunate legal situation from the subscribers' point of view arises if excessive depreciation charges have been made, because the United States Supreme Court has held that excessive charges made and collected by a public utility in the past are so much "water over the

dam" and not retrievable.⁴⁶ Commissions are supposed to be alert to observe such excesses and put a stop to them before they have continued over a long period of time. However, from an economic standpoint, we should look into these charges. In *Lindheimer v. Illinois Bell Telephone Company*⁴⁷ the United States Supreme Court pointed out the huge excessive depreciation charges made by that company as contrasted to claimed observed depreciation. The Illinois Company claimed only \$15,828,000 observed actual depreciation but had set aside charges of \$48,362,000 to the depreciation accounts. In a recent New York investigation the Commission found excessive depreciation accounts of \$25,000,000, and stated that it was not correct to charge subscribers in excess of retirement costs of the equipment they were using.⁴⁸ In 1936 the California Commission pointed out that the discrepancy between charges and observed depreciation was virtually as great as in the Illinois Bell case. Here the difference was between \$10,000,000 and \$29,000,000.⁴⁹ In Louisiana, the Southern Bell had set up a depreciation account of \$9,349,000 but claimed only \$3,891,000 in actual depreciation.⁵⁰ These examples of depreciation charges against subscribers in excess of admitted observed depreciation indicate that many companies have been setting aside more than ample depreciation to provide new and modern equipment without further charges against subscribers because of early retirements. There may be doubt whether the Supreme Court would sup-

⁴⁵ The British Post Office began supplying modern handsets to its subscribers in 1930, and as of January, 1937, had 40% of 2,750,000 stations converted to handset use. This is approximately the same percentage as in America in the Bell System. Average charges for handsets in England since 1930 appear to have been continually below the American average. In 1931 the charge in England was approximately \$2 a year (8/0) recurring, while in America the predominant charge was \$3 a year recurring; in 1933 the English charge was about \$5 (£1) lump sum, while the American charge averaged about \$6 to \$9 in total; in 1934 the British charge had been reduced to about \$2.50 (10/0), while in America the predominant charge was still \$6 to \$9. Today (June, 1937) the lowest charge in the United States is \$1.80 while in England it is \$1.25 (5/0). (The Wisconsin charge is but \$.96 a year but is unlimited as to duration of collection.)

Information on British charges is furnished through the Telecommunications Department of the General Post Office.

⁴⁶ *Board of Pub. Util. Commissioners v. N.Y. Tel. Co.*, 271 U. S. 23 (1926).

⁴⁷ 292 U. S. 151 (1934).

⁴⁸ *Re N.Y. Tel. Co.*, 14 P.U.R. (N.S.) 443 at 450 (1936).

⁴⁹ *City of Los Angeles v. Southern Calif. Tel. Co.*, 14 P.U.R. (N.S.) 252 (1936).

⁵⁰ *La. Pub. Serv. Com. v. Southern Bell Tel. & Tel. Co.*, 15 P.U.R. (N.S.) 482 (1936).

port any commission which required use of these excessive reserves in such a manner.

Finally, can we say that the various companies have desired the extra charge as a deterrent to handset usage or as a means of securing additional revenue? The facts point to the conclusion that both objectives were desired. In the case of the small independent telephone company (not associated with the large Bell organization) which does not get a large amount of the more profitable city business, ample evidence supports the sincerity of the deterrent claim. Many of these companies have not had sufficient revenues to meet all operating expenses and set aside adequate depreciation reserves, and as a result have not the credit which could be used in obtaining additional funds for investment in new handsets. For this reason they do not want business which would not "pay its own way."

On the other hand, we cannot as fully justify over any long period of time the argument for a deterrent charge in the case of the large companies. After 1929 the employees in all departments of Bell associated companies were enrolled as "salesmen" of telephone service, and an intensive employee sales campaign was put into effect to promote use of telephone equipment and service among their friends, acquaintances, and neighbors. Among possible employee sales attention was given to obtaining new users of handsets. Subscribers were given various kinds of advertising on handsets with their monthly bills, and nationally circulated advertisements continually pictured a subscriber using one. This is hardly to be interpreted as the action of any company which wished to deter handset usage and which was finding the furnishing of such service unprofitable. One is reminded at this point of the

statement of Chief Justice Hughes of the United States Supreme Court in the Lindheimer case of 1934 when he said, "Elaborate calculations which are at war with realities are of no avail."⁵¹

Savings Effected by Handsets

The subject of costs and charges requires a statement about actual savings which the handset has made possible. Savings are reported by FCC engineers on several points. (1) The handset renders more perfect articulation and thereby cuts down the number of repetitions necessary in conversing; this in turn reduces the length of time equipment is tied up, as well as making subscribers more satisfied with the service. (2) Under the former system it was necessary to build two types of desk stand transmitters, one, more sensitive, to be used on "loops" greatly distant from the central office where line currents were weaker, and the other, less sensitive, for distances not great from the central office. This "zoning," as it was termed, was costly; so in designing the new handsets one objective was to eliminate the difficulty. The handset accomplished this saving as well as even showing less "burning" of transmitter carbons, a further saving to the company using handsets. (3) The handset transmitter, by being more sensitive and efficient, makes it possible to use a smaller wire in the cables used in telephony. The smaller gauge wire will effect a great saving in wire costs when the new wire system has been completely coordinated with the telephone plant over a period of years.

Future of Handset Charges

In the very near future the handset charge will be completely eliminated, either by action of aggressive state com-

⁵¹ 292 U.S. 151 at 164.

missions or by the policy of the telephone companies. In the 1935 annual report of the A. T. & T. that Company said: "It is the policy of the Bell System companies to continue to reduce these charges as conditions in various states permit, until they are entirely eliminated." The handset charge has not been popular with telephone subscribers. As early as 1931 and 1932 frequent complaints were received by various commissions from unsatisfied subscribers. In 1933 the Oklahoma Commission, making an investigation upon the petition of a county attorney to have the charge eliminated, said that they would feel justified in setting a rate of only 10¢, and that no charge could be justified for a very long period of time.⁵³ In 1934 the City of Detroit petitioned the Michigan Commission for elimination of all handset charges, and in 1936 the City of Chicago filed a like petition with the Illinois Commission. In his annual mes-

sage in 1937 Governor Lehman of New York advocated complete elimination of the handset charge, saying, "... the time, I believe, has come to put an end to this practice. . . ."⁵⁴ The New Jersey Commission has already announced that all charges will be eliminated after January 1, 1938,⁵⁵ and during 1937 the state legislature of Connecticut passed a bill outlawing the charge. This bill was later vetoed by the governor.⁵⁶ The New England Telephone and Telegraph Company, following an agreement with the Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont Commissions, will eliminate the charge in December, 1937.⁵⁶ An independent company in New York State eliminated the monthly charge for all subscribers beginning August, 1936, and now charges only a change-of-instrument fee of \$1.00.⁵⁷

⁵³ 112 *Telephony* 31 (Jan. 23, 1937).

⁵⁴ 112 *Telephony* 29 (Feb. 20, 1937).

⁵⁵ 112 *Telephony* 32 (July 10, 1937).

⁵⁶ 112 *Telephony* 36 (Aug. 5, 1937); 113 *Telephony* 28 (September 25, 1937).

⁵⁷ 111 *Telephony* 29 (July 25, 1936).

⁵⁸ *Re Southwestern Bell Tel. Co.*, 3 P.U.R. (N.S.) 555 (Abstract).

Economic Implications of Homestead Tax Exemption*

By R. E. CARLSON

IN THE last two or three years there has been a widespread movement to provide tax relief for homestead property, either by allowing exemptions or by giving preferential treatment, such as lower assessments or lower tax rates to qualified residence sites. Most of the material written on this recent movement has been concerned primarily with practical problems of administration and definition, while little or no consideration has been given to the more fundamental economic effects which may be expected to follow from a policy of tax exemption. In discussing a few of these economic implications it is hoped that some new light may be thrown upon the conflicting claims of homestead exemption.

A number of objectives of a social and economic nature, which homestead exemption is expected to accomplish, may be briefly outlined. They may be summarized into one main goal — namely, to encourage home ownership as a factor in national, economic, and social stability. The secondary purposes enumerated in the current literature are: (1) to relieve homestead real estate by shifting a part of the tax load to other kinds of real estate, or to commodities; (2) to make the homestead right secure against sale for taxes; (3) to stimulate the demand for residential real estate by offering exemption to prospective owners; and (4) to force reorganization of the whole ad valorem system by widening the

tax base and relieving property in general.

Most popular publications, newspaper writings, and propaganda are directed at these social ends, seeking to impress upon the voters of a state the necessity of extending home ownership. It is not within the scope of this article to examine these social purposes but, assuming their validity, the question may be asked: Is homestead exemption likely to accomplish what is expected of it? Will the economic and fiscal repercussions outweigh the advantages it is expected to confer?

One of the distinct limitations in a study of exemption at this time is the lack of satisfactory factual materials or of any substantial experience from which might be inferred the probable consequences of homestead exemption. Therefore, theoretical analysis must be relied upon in reaching any tentative decision on the effectiveness of homestead exemption in accomplishing its objectives.

Incidence of Increased Tax Rates

One of the first consequences almost certain to follow in the wake of homestead exemption is an increase in the rate of existing property taxes, since only two of the ten states having exemption also have tax limitation laws. In Minnesota, for example, the increase in tax rates has been directly attributed to the preferential treatment accorded homesteads under its classified property tax of 1933.¹ What effects might

*Adapted from portions of a Master's thesis accepted at Northwestern University, June, 1937.

¹*Facing the Tax Problem; Survey of Taxation in the United States* (New York: Twentieth Century Fund, 1937).

follow similar action in other states? The question will be considered from three points of view: the effect on homesteads, on non-homestead dwellings like apartment buildings, and finally on industrial and commercial property.

The Effect on Homesteads. In such states as Minnesota, where there is no exemption of an absolute amount, increased tax rates simply diminish the benefits of low assessments. Even so, a net gain remains to the home owner for he still gets a subsidy, though a somewhat smaller one than if the old tax rates were continued. In other states where a blanket or absolute exemption exists, the effects are different. Those homesteads which enjoy complete immunity are, of course, not affected by the tax however high it goes. Other homesteads, with an assessed value above the amount of tax exemption (partial immunity), will pay the higher rates on that share. This tax cannot be shifted.

Effects on Non-Homestead Residential Property. An increased rate on apartment houses will fall temporarily upon the owner, since he is bound by leases with a stipulated rental. When the lease expires he may attempt to shift some of the tax on his tenants and his success will depend largely on the competitive situation and the elasticity of the tenants' demand for housing.

A building is a form of capital and in a perfectly competitive market a tax on capital, while it may fall on the owner in the short run, will eventually be shifted, in greater or less degree, to the users of capital—the tenants in this case. It is true that apartment buildings are physically fixed and to that extent they resemble land and yield what Marshall calls quasi-rent. This immobility does not invalidate the conventional analysis but simply checks

the equilibrium of supply and demand at the normal price level. That is to say, there is a longer spread between the short- and long-run effects. Thus as long as the supply of apartment buildings is not increased, and it takes time to construct one, the tenants may be subject to the tax.

The elasticity of demand for housing contains the crux of the tax-shifting problem in relation to apartment houses. If the demand be elastic, the landlord can put less of the tax on the tenants; if the demand be relatively inelastic, the owner may shift the greater portion. This continues only until a new supply of buildings is constructed when competition among the landlords will drive rentals down.

On the other hand, where the supply of apartment houses has been constructed under the stimulus of real estate speculation, without regard for prospective taxes, the final incidence may rest upon the owner of the building.² Whenever capitalists furnish the same goods and services regardless of a reduction in reward caused by an additional tax levy, they are bearing the tax. Or if an entrepreneur, in constructing houses for sale, makes an inaccurate forecast because of speculative conditions in the real estate market, he automatically bears the burden of his mistakes, whether they be taxes or a low return on his capital.

Effect on Commercial and Industrial Property. This type of capital represents producers' goods, notably factories, stores, etc. A specific tax on producers' goods will presumably fall on the marginal unit or marginal machine which is subsequently withdrawn because of the decreased return. The

² Simpson, Herbert D., "The Incidence of Real Estate Taxes," 22 *American Economic Review* 219-230 (June, 1932).

marginal productivity of the remaining capital increases, and that of labor decreases. If the latter be true, and labor is paid according to the productivity of its marginal worker, labor may absorb some of the burden in the form of lower wages.³

Urban and Rural Effects

Homestead exemption has varying effects in urban and rural communities as a result of the different proportions between land value and value of improvements. In rural areas land value is obviously the greater and it carries the bulk of the agricultural property tax, which cannot be passed on in higher prices for produce because these prices are set in central markets which are not much influenced by the situation of the individual farmer. With a tax levied on his margin of cultivation does the farmer drop that land out of production to decrease the supply of the commodity, without which there can be no shifting? On the contrary, he increases his production in an effort to augment his gross income enough to pay the tax and, needless to say, when all farmers try the same tactics, the effect on the available supply of produce is obvious, and prices go down. Thus his gross income may actually decline instead of being increased and the fixed tax burden may rest heavily upon him.

To the extent that homestead exemption partially or completely removes the fixed tax burden, it will provide needed relief for the farmer. If he can operate his farm in the most efficient manner without being forced by tax liability to push production beyond the limits of effective demand and to farm poorer ground with higher costs of operation, he will gain.

On the other hand, if the farmer is

cultivating a given portion of his land in order to meet his taxes, he will not be likely to reduce his volume of production when tax exemption is provided. It may be assumed that his receipts will continue the same, whereas his expenses have now been diminished by the amount of the tax benefit. This benefit is simply a windfall, providing him with surplus income.

Another effect may occur when, under homestead exemption, the farmer can see his way clear to acquiring some additional land which will become part of his homestead and thus tax free. He may do so and begin producing on the new land. To this extent, the margin of cultivation is pushed out and land which was formerly marginal may now yield some differential rent. This rent might be considered a form of farm relief, for it increases the farmer's gross receipts. As noted above, however, and assuming demand to be inelastic, the increased production, if attempted by the bulk of farmers, will lead to a fall in prices which may more than offset the slight advantage of this newly created differential rent.

Finally, when the farmer undertakes to sell his property which consists largely of land, he will find the increased net return enhances its value, which may be capitalized. For subsequent purchasers, therefore, there is no direct benefit from exemption for they have had to pay the capitalized amount of the annual tax saving.

The urban situation will be affected differently for the value of buildings frequently exceeds that of the land, and the incidence of a tax on apartment buildings, as a form of capital, is governed by different principles. If the earlier assumption be continued — namely, that homestead exemption results in increased taxes on other forms

³ Jensen, Jens, *Property Taxation in the United States* (Chicago: University of Chicago Press, 1931), p. 91.

of real property—then the question of incidence arises between the owner and the apartment tenant. Because of leases the owner must first absorb the tax, but in the long run he may cooperate with other owners to decrease the supply of buildings and, demand remaining the same, rentals will increase, thus shifting the tax to the tenant. This withdrawal of capital is a time-consuming process and is done by neglecting repairs and replacements, in contrast with the inflow of capital which is accomplished much more quickly by new construction. It may be questioned, however, whether present owners will "cooperate" to restrict expansion. Past experience, at least, seems to indicate that such a possibility is remote, for when the speculative element enters the market, builders seem to ignore the extent and elasticity of demand for housing; in such cases shifting a building tax to the tenant is not likely.

The permanent rural effects may be to increase land prices if the increased net return be capitalized, whereas in the city the permanent effect will be to stimulate the building of homes until the net return on the investment equals the market rate, together with some increases in urban land values. In essence this difference in effect lies in the fact that the benefits of tax savings can be capitalized in the case of land, but not for residential buildings whose value in the long run is set by cost of production, like any other form of capital.

Some of the advantages claimed for homestead exemption are thus realized. Home owners, both rural and urban, get immediate relief and in the urban areas there is a shift of population to new and better homes. The increased building activity will ultimately lower tenancy where present tenants move to their own homes. Also when they take

up new homes and there is no compensating increase in population, demand for apartments will fall off and competition among apartment owners will tend to drive rentals down. Hence, tenants who continue to live in apartment houses benefit indirectly from homestead exemption, even where they do not benefit directly by going out and building for themselves.

Thus two distinct forces are in operation; one puts the increased tax burden, which arises from exemption, on the tenant, while the other operates to give the tenant some benefit by lowering rentals. The first is postulated on a decrease in the supply of apartments, demand remaining constant, and the second assumes a decrease in demand for apartments, the supply remaining constant. How much of the burden actually falls on the tenant will vary, therefore, as one or the other of these two tendencies is dominant. (The second tendency is, however, a short-run phenomenon and the supply of capital will eventually be decreased; the tenant could thus expect no permanent benefit from homestead exemption.)

A third possible effect on the apartment tenant is that he may suffer a direct loss quite apart from any raising or lowering of rentals. This situation may arise whenever new taxes are levied, such as a state income tax or sales tax which reach both the home owner and apartment tenant; the loss to the home owner is mitigated by the direct saving in taxes on his home, whereas the tenant may receive no such compensation.

As noted above, the effect of an increased tax on agricultural land is such as to increase the available supply of farm products. This condition provides a fourth effect of exemption and one favorable to apartment tenants, in that it lowers the price of farm commodities

consumed by them. The benefit of lowered prices is not limited to tenants, but applies to all urban dwellers.

Effect on Land Values

In a situation where there is no building activity there will be no demand for sites, and it is difficult to see how land values can be affected. On the other hand, in a period of new construction there will be some demand for sites and the buyer, before purchasing the land, will presumably capitalize the prospective taxes, which sum he deducts from the purchase price. Thus the process of capitalization, as defined by Seligman, brings a "change in price equal to the capital value of all anticipated payments."

If it be assumed that property taxes are sufficiently stable and permanent to be capitalized in the sense that Seligman, Davenport, Lutz, and others use that term, the present owners alone gain from homestead exemption for they have purchased the property at a lower price and they are now freed from taxes. Against this gain numerous arguments are advanced in the current literature to show the inequity of exemption in giving bonuses to present owners but none to future owners. The tax benefit would also be subject to capitalization and, since it is likely to be capitalized on the first sale after the relief is afforded, the seller pocketing the capital value of the annual exemption, future owners will be no better off than were present owners before exemption. Because property changes hands with some frequency, it appears that the relief will only be temporary.

If the opposite of this were true—namely, that tax benefits do not tend to be capitalized—homestead exemption will offer relatively permanent relief to homestead owners, each successive generation enjoying the exemp-

tion from the annual tax and using the proceeds of their tax money to improve their own plane of living. This conclusion is of great significance in evaluating homestead exemption, for obviously, if it appears that the benefits do not apply to future owners, the very props are removed from under the social argument that exemption encourages home ownership. A temporary relief in the form of a subsidy is hardly to be tolerated if, as advocates of exemption assert, the social objective is primary.

A notion prevails in the studies of homestead exemption made by some of the states that the tax saving on the entire property (land and buildings) may be capitalized, thus enhancing real estate values as a whole. But there is a distinct difference between the building, which is a form of capital, and the land upon which it stands. Since the cost of a building will, in the long run, determine its value and a property tax will not affect the cost of erection, it is hard to see how any portion of the tax benefit attributable to the house can be capitalized.

Another effect of homestead exemption may appear in connection with absentee ownership of homestead property. Since a rise in state and local tax rates or assessment rates is probable, in order to recoup some of the revenues lost as a result of exemption, all absentee landlords will be anxious to sell out to their tenants, withdraw the capital invested in homesteads, and put it to other uses such as buying property in a state that does not have homestead exemption, or investing in securities. If an absentee landlord refuses to sell, he is subjecting himself to relatively higher taxes on his property. In view of this fact it is possible that homestead exemption may tend to eliminate absentee ownership of homesteads, for the benefits of exemption

accrue only to owner-occupied property.

Stimulus to Building

It is not possible to obtain any statistical evidence of how much expansion in the construction industry is attributable to homestead exemption and how much to other causes. The usual argument is that homes, now being exempt to a certain sum, will be attractive investments for people renting apartments, and capital will flow in from less profitable uses until a new equilibrium is obtained in the general rate of return to capital. Presumably the tenants on the margin have been carefully weighing the relative costs and anticipated benefits of home ownership. Now exemption will throw these marginal buyers into the market and they constitute a new demand for housing and labor. Tenants in this marginal category will continue to leave their apartments and build until the cost, with exemption, will exactly balance the benefits expected to accrue. At this point the demand for houses ceases and a new margin is established which will presumably stand until some new incentive for home ownership becomes operative. It is important to note that this new demand comes only from tenants now living in apartments, for if the tenant already occupies a residence there is no new building but only a transfer of ownership from landlord to tenant. In other words, the possibility of homestead exemption encouraging building and increasing the demand for labor depends on whether the energy devoted to building is newly created, or merely diverted from some other channel.⁴

To assume, as some have done, that this building spurt will be very extensive is to exaggerate the significance of taxes as one of the costs of home ownership, for they frequently repre-

sent a relatively small portion of the total expense connected with erecting and maintaining a residence. Often the fixed charges involved in financing the home are more burdensome than the annual tax payment, and to this extent the agencies of the Federal Government providing cheap credit are more effective in stimulating home ownership than a rebate in taxes. In Texas, for example, with an exemption of \$3,000 and a tax rate of say, 2%, the annual tax saving would be \$60; in other states like Oklahoma with a smaller exemption of \$1,000 and a tax limit of 1¼%, the annual saving is only \$12.50! Just how much incentive would an item of \$12.50 provide for home ownership? Probably only to those marginal renters who are already about to enter the market for homes.

Several factors besides taxes enter into a decision to build. These include: low interest rates, sound lending agencies and adequate credit, the level and prospective stability of wages, the extent and security of employment, marketing prospects, and finally the alternative uses for one's money.

Sources of Capital

It is frequently asserted that homestead exemption, by stimulating the building of new residences, will result in a net increase in the social capital. Hence, it is important to examine briefly the sources from which this alleged increase will come, to ascertain whether it involves a simple transfer of capital from one use to another, or actually creates new capital.

When homestead exemption is introduced, there is little doubt but that some new construction will be undertaken, which results in an increase in

⁴Haig, R. M., *Exemption of Improvements from Taxation in Canada and United States* (New York: M. B. Brown Co., 1915), p. 268.

the demand for capital however slight, while the available supply remains constant. If homestead exemption were widely adopted and other conditions were favorable, this relative increase in the demand for capital might be very substantial, resulting in a rise in the general rate of interest which in turn might stimulate new savings. In the actual situation, however, the capital needed for homesteads is so small in proportion to the total demand for capital that it is virtually negligible.

Any new savings would probably come from present apartment tenants who desire to own a home and undertake to increase their savings by further restricting consumption. The amount of these new savings may be attributed to the stimulus of homestead exemption, and thus constitute a net increase in social capital. In any other situation the sources of capital represent mere transfers from other uses. Thus, if an apartment owner decides not to erect another multiple dwelling but loans his funds to homestead builders, it is a transfer of capital. Similarly, when a person liquidates securities to get cash with which to build, it is a transfer and there is no new demand for materials and labor. It must be concluded that no new energy for construction will be created unless new savings are made.

Summary

First, it is expected that homestead exemption will relieve homestead real estate by shifting a part of the tax load, and there seems to be no doubt that exemption will accomplish this. Where it applies only to state levies the relief is not so great, but nevertheless there is some lightening of the burden. Second, exemption is intended to make the homestead right secure against sale for taxes. Here again exemption accomplishes its aim, for when a man's taxes are lowered or wiped out, he is in little

danger of losing his property to the state. Third, it is hoped that exemption will stimulate the demand for residential real estate. Since the annual tax saving seems to fit the requisites of capitalization reasonably well, it is likely to be capitalized by present owners, resulting in an increase in the value of land suitable for homestead sites. Consequently, some of the benefits of a tax saving are temporary and a buyer must borrow more heavily to meet the higher purchase price, thus paying in fixed interest charges and principal what formerly went in taxes. Yet in residential areas where land value is a relatively small part of the combined value of land and building, homestead exemption may still be effective. With only a minor share of the exemption savings subject to capitalization, the remainder accrues to the benefit of each successive owner, thus offering some inducement to prospective builders. To the extent that it discriminates against absentee owners, tax exemption will bring some increase in owner occupancy of homesteads.

The fourth and remaining objective is that exemption will force reorganization of the whole state and local tax system. Again, homestead exemption seems inadequate to accomplish the task, for it relieves only a small class of real estate which is subsidized at the expense of other types of property. If tax exemption were accompanied by a thorough-going reform in the administration of the general property tax, it might fill a real need, but from all indications this improved administration and more scientific assessment practices are not forthcoming. Those states having homestead exemption are simply turning to excise taxes and higher rates on other forms of property instead of undertaking the more painful task of revising their tax structures.

The Relation of Electricity Consumption to Purchasing Power

By W. J. CROWLEY* and C. H. BAILY†

THE utility manager, in attacking the sales problem, has available several tools, as they might be called, all of which are, to some extent at least, under his control. These are: (1) price of service, (2) rate form, (3) price of appliance, and (4) sales methods.

The manager's task is to decide what combination of these factors will accomplish his purpose most economically. In a general way he knows that, within limits, the lower the price of service, the greater will be the sales of service. As far as rate form is concerned, he probably will be undecided. The general tendency in rate making is toward simpler rate forms, but the experience of the Commonwealth and Southern Corporation and other companies has shown that considerable complexity in rate form is no deterrent to sales of service.¹ Price of appliance the manager considers in much the same light as price of service. Sales methods can be varied almost at will to meet the particular sales problem. However, in the final analysis, definite knowledge regarding the effect of each of the above factors by itself and in combination with the others is not available.

The problem of deciding upon the proper combination of sales-promoting elements—price (both service and appliance), rate form, and selling method—is further complicated in practice by the economic situation of the consumers to be approached. In simple terms this eco-

nomic situation is usually described roughly by some index number denoting relative purchasing power. The problem is further complicated by such factors as prices of competing utility services, or other substitute services, and at any particular time by the phase of the business cycle. These three factors—purchasing power, price of competitive services, and the business cycle—may be termed uncontrollable factors, since the utility manager is unable to change them as he can the other factors listed previously.

The complicated array of factors present in any situation to be analyzed prevents the use of simple or direct means of measuring the effect of each. In order to study the effect of any one of the controllable factors the process must be something like this: first, the uncontrollable factors must be evaluated in some way and, second, the controllable factors must be varied so that the effect of each can be observed. This is not quite as simple as it sounds, for even though a situation can be found, where all factors involved could be controlled, it would still be impossible to use a simple or direct means of measuring the effect of each—for example, by varying price of service up and down in order to observe the effect of price changes on sales of service. This method is available to department store managers; in fact, it is one of the best methods they have for determining the price that will move a

* Assistant in Office of Vice President in Charge of Operations, Public Service Company of Northern Illinois.

† Rate Analyst, Public Service Company of Northern Illinois.

¹ It would probably be more exact to say that complicated rate form, if it is an obstacle to sales of service, has not been found to be insuperable. The complicated features of the "objective" type rates disappear when the ultimate rate has been reached.

particular quantity of goods. Even if the method could be used by a utility manager who happened to be in the mood for experimenting, it would be unsatisfactory, for several years would be required to work out the full effect of changes in price of service. A method which appears to be entirely practicable, however, would be to compare the effect of different rate levels in communities of similar purchasing power, in which, also, the controllable factors other than price of service have been the same.

It appeared to the writers that a survey could be undertaken using this last method with some expectation of worth while results. First, however, it would be necessary to establish definitely that there is a relationship between electricity consumption and purchasing power and in order to do this the effect of all other factors would have to be eliminated or controlled. These considerations naturally directed attention to those companies supplying utility service in a large number of communities, and principally to companies maintaining uniform rates over a wide area. In the area served by a single company it was anticipated that there would be better chance of finding groups of communities where appliance prices and sales methods would be quite uniform; and in uniform rate areas, moreover, rate form and price of service would be the same in all communities served. In the latter case, the only variables would be purchasing power and competition.

Objectives and Methods

It might be well at this point to describe a little more fully the results that were sought and the method employed. A careful reading of several studies deal-

ing with the relation of price to sales of service showed that the purchasing-power factor had been given insufficient weight or had been neglected entirely. It was thereupon decided that the communities in a uniform rate area should be studied with particular reference to the possibility of discovering some means of measuring relative purchasing power. The final step would be to apply the measure of purchasing power to communities having different rate levels, to the end that any differences between average consumption² of service in communities having different rate levels but similar purchasing power could be noted. However, this article deals only with the preliminary phases of the study, e.g., determination of the relationship, if any, that exists between consumption of electricity and purchasing power and discovery of a method of rating communities according to relative purchasing power.

The term "purchasing power" usually refers to ability to buy consumers' goods in general. In the discussion which follows, the term will be used in a narrower sense, i.e., referring to ability to buy utility service. This distinction is made here because in the search for a scale on which to grade the various communities, what really was desired was some index of ability to absorb utility service, whether or not that index might be valuable as a general index. As a matter of fact, the index finally adopted may be excellent for general purposes, but that is of no immediate interest in this study.

The method adopted for this study was (1) to analyze certain economic data bearing on purchasing power of the communities studied, and (2) to correlate each of the series studied with available data which definitely indicated the

² The entire study was devoted to the relationship of price and sales in the case of domestic electric service. Therefore, whenever the terms "consumption" and "average consumption" are used, they mean "consump-

tion by residential customers for domestic purposes" and "average consumption per residential customer," respectively.

ability of the consumers in each community to make use of utility service. For example, the following data were available for each community: (1) average kilowatt hours per customer, (2) average therms of gas per customer (for domestic purposes), (3) number of automatic gas water heaters in use in residences, and (4) number of gas space-heating installations in use in residences. It appears entirely reasonable to assume that the customers' present use of certain major utility appliances and utility service is a definite measure of their ability to purchase such appliances and service—at the existing rate level, of course.

The group of communities used in this study are located in northern Illinois. The particular territory has been a uniform rate area for many years. Appliance prices have been quite uniform over this territory and, in addition, sales policies adopted by the company serving this area have in general applied from one end of the territory to the other. Of particular advantage in this instance is the fact that the price of the principal competitive service, gas, is also quite uniform throughout the area, since the company furnishing electric service also supplies gas in substantially all communities included in this analysis. In the few other instances, gas service is supplied at rates and under policies quite similar to those in the majority of the communities. In all, 84 communities were studied,³ and these fell into the following population groups:

Population	Number of Cases
Above 10,000	20
5,000 to 10,000	13
3,000 to 5,000	14
2,000 to 3,000	12
1,000 to 2,000	25
Total	84

From the foregoing it is apparent that, of the factors discussed (both controllable and uncontrollable), the only one that varies substantially as between communities is purchasing power. That one factor, however, varies widely, ranging from a high level in the suburban communities along the lake shore north of Chicago to a very low level in certain industrial communities. Presence of this wide range naturally was of advantage in this instance, since the primary object of the study was to find a suitable index of purchasing power.

As the first step in finding the desired index, the towns were separated into the population groups set forth above, so that each of these groups of towns could be studied separately, as well as in conjunction with the other groups. Such classification would also aid in discovering whether or not the average customer in large communities in a particular purchasing-power range had different characteristics than the average customer in a small community having the same relative purchasing power.⁴ The towns in each group were then listed according to purchasing power, not on the basis of a purchasing-power index, but according to personal opinion of

³ Incidentally, the study embraced every incorporated community in the uniform rate area where the population was 1,000 or more, excepting only 15 communities which have no gas service. These 15 communities were not compared with the others because of the desire to avoid any distortion in the electric sales situation brought about by lack of gas service.

⁴ It appears, from the results so far obtained in this study, that no differences are explainable purely on the basis of size of community. This brings to mind the fact that early in the depression, when many comparisons of public utility rates were being made, certain rate engineers, in an attempt to make valid rate comparisons and to trace the effect of rate level on consumption, compared rates and consumptions in particular towns with rates and consumptions of the nearest towns of the same size. A fairer comparison would have resulted, it seems, if rates and consumptions of the nearest towns of similar purchasing-power level had been used.

several people familiar with the entire territory.⁵ With the lists set up as described, the next step was to find economic data on which to base a purchasing-power index.

No attempt will be made to describe in detail the work done. It will be sufficient to list the more important series of data that were analyzed and to tell why each was or was not used in setting up the index adopted. First, however, the general ideas that were the limiting influences in the choice of the index will be mentioned.

When the survey was undertaken, it was the intention that a great many cities all over the United States would be included in the study. Of necessity, therefore, an index of purchasing power was desired that could be obtained and applied without complex calculations. As a matter of fact, this point was considered so important that the decision was made to seek simplicity at the expense of hair-line accuracy. For all practical purposes hair-line accuracy would be difficult to check anyway, and it

appeared that, if the various towns were to be classified into several broad groups rather than along a continuous scale, the degree of accuracy required would be somewhat less than could be obtained if necessary. Another point of importance, discovered later, was the fact that, if small communities were to be studied, the purchasing-power index had to be one that could be determined from data available for small, as well as large, communities. Much valuable information bearing on purchasing power is available for large but not for small communities.

The following series of data (all by towns) were studied: (1) number of passenger automobiles registered, (2) number of residential main-station telephones, (3) number of home-owning families, (4) number of single-family dwellings, (5) value of owned and rented homes, and (6) number of income tax returns. These items are listed in no particular order. The last two proved to be the most valuable for the purposes of this survey.⁶

⁵ It may appear that mention of this little experiment is out of place in this study. It should be kept in mind, however, that what appears to be required is a purchasing-power index that can be applied with the minimum of complication. If, for example, a group of salesmen could, in view of their experience in a group of towns, rate these towns according to the relative abilities of the consumers to buy the service which the utility company supplies, why should complicated studies be undertaken to determine this same thing? It is interesting to note here that in the lists set up on the basis of personal opinion, the selections for the highest and lowest purchasing power groups were fairly accurate, when compared with the results determined upon analysis of certain economic data. Selections for the intermediate groups were found to be quite inaccurate.

⁶ The reasons why the others were less valuable are summarized here.

Number of Passenger Automobiles Registered. Comparisons showed that the decline in number of automobiles per 1,000 population from well-to-do towns to poor towns was not as sharp as was expected, because people in the poorer communities, instead of doing without automobiles, merely got along with cheaper automobiles. Moreover, the number of automobiles per 1,000 population was to some extent a function of

other available means of transportation. This factor tends to disappear where towns are far apart, but is present in areas such as the suburban territory around a large city like Chicago, where many people do not work in the community where they live.

Number of Residential Main-Station Telephones. The number of residential main-station telephones per 1,000 population appeared to be a good index of purchasing power as between communities of approximately the same size. The telephone data were not studied as thoroughly as the others listed because it appeared that there would be some difficulty in getting up-to-date figures on number of telephones on short notice for a large number of communities throughout the country.

Number of Home-Owning Families per 100 Families. The number of home-owning families per 100 families turned out to be a very poor index of purchasing power. Ability to buy a home does not always result in home ownership. Consider, for example, the large number of well-to-do people who live in apartment hotels. Some of the highest ratios of home-owning families to total families were found in relatively low-purchasing-power communities.

Number of Single-Family Dwellings. It has been de-

(Footnote 6 continued on page 354)

The various series of data were reduced to the form of ratios in order to carry through the correlation calculations. The divisor in each case was either number of families, number of electric residential customers, or population (1930 Census).⁷ Each of the series of ratios was then correlated with each of the series of data that had been selected to represent the ability of the customers in each town to buy utility services. In the case of the first four series—automobiles, telephones, owner families, and single-family dwellings—the correlation ratios obtained were too low to permit their use for the purpose desired. However, when the last two series were correlated the results were far in excess of expectations. These results will be described in more detail.

Results of the Measurement

The data on values of homes were obtained from the 1930 Census (Volume VI, Families). Unfortunately, the information was shown only for cities of 10,000 population and over; therefore, only one of the four groups of communities could be used in this calculation. The results were unusually good, the coefficient of correlation obtained being .967 when "average kilowatt-hours per customer in 1936" was correlated with median property values for the 20 communities in the group. It is

hoped that some means will be found to extend this valuable series so that it can be used for communities under 10,000 population.

The best results appeared in the correlation of average kilowatt-hours per residential customer and income tax returns. The number of individual income tax returns per town was taken from a report of the Treasury Department, Bureau of Internal Revenue, listing for each incorporated community of more than 1,000 population the number of income tax returns by years.⁸ In the first calculations, average kilowatt-hours per residential customer for the year 1936 was correlated with the number of income tax returns per 100 domestic customers, and high positive correlation was found. The actual results are shown in the following table:

Population Group	Number of Cases in Each Group	Coefficient of Correlation
Above 10,000	20	.938
5,000 to 10,000	13	.914
3,000 to 5,000	14	.890
2,000 to 3,000	12	.919
1,000 to 2,000	25	.835
Entire group	84	.908

The relationship shows up very well on Chart I where each point represents one of the communities included in the study. Chart I gives a very good idea, too, of the range of average consump-

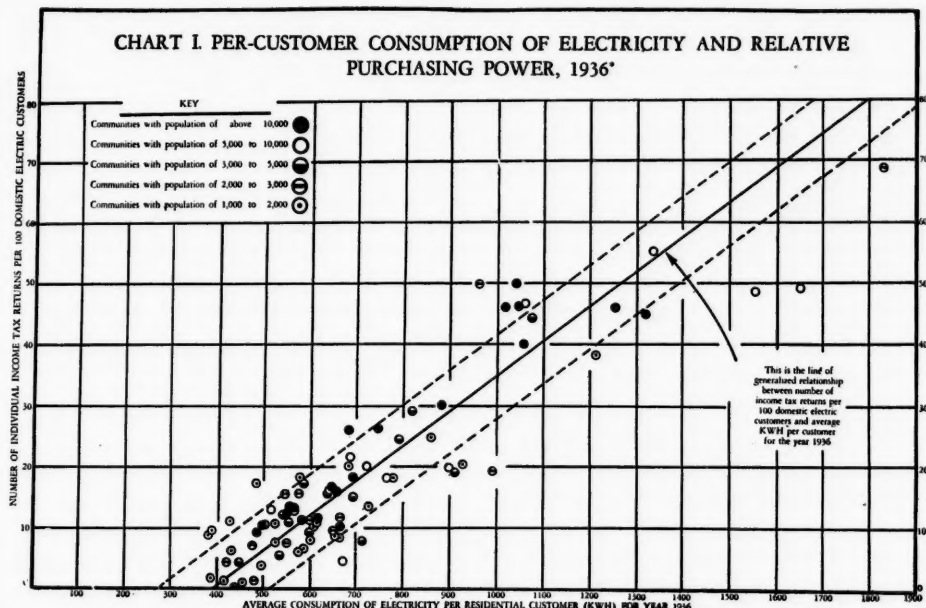
(Footnote 6 continued from page 353)

monstrated that the average family living in a single-family home uses more electric and gas utility service than the average family living in a multi-family building. (See W. J. Crowley and H. S. Jacobs, "Consumption Characteristics of Domestic Gas Customers," 12 *Journal of Land & Public Utility Economics* 126-132 (May, 1936).) For that reason the effect of variations in percentage of total number of families living in single-family homes was studied. The results were not satisfactory for setting up a purchasing-power index. In certain high-purchasing-power towns, a large percentage of the families lived in apartment buildings. Again, in some low-purchasing-power towns, practically every family lived in a single-family dwelling.

⁷ One of the first series of correlations worked out

was to determine whether or not much difference resulted when one divisor was substituted for another. The differences obtained were not of any great importance.

⁸ The most recent income tax data available at the time the present study was in progress were for the years 1932 and 1933. There was some doubt as to whether or not income tax data for these years would accurately reflect the relative positions of each of the communities on a purchasing-power scale. After several tests had been made, however, it appeared that, although the number of returns was low for the two years in comparison with those for normal years, the relative positions of the towns (based on income tax returns per 100 families) was unchanged, or only slightly changed, by use of the data for depression years.



tions, as well as the number of individual income tax returns per 100 domestic electric customers encountered in the group of towns studied. The heavy solid line on the chart, which is referred to as the "line of generalized relationship" is the line along which, on the basis of the existing relationship between the two series, the most probable values of average consumption (kwh) per residential customer predicted from known values of number of income tax returns per 100 domestic electric customers would fall.⁹

In order to determine whether or not the degree of relationship between the two series was constantly maintained, because of the possibility that the 1936 data exhibited only accidentally a high relationship, the calculations were repeated for the year 1931. The results obtained were comparable to and equally as good as those for 1936. For com-

parison, the following table shows the degree of relationship found:

Population Group	Number of Cases in Each Group	Coefficient of Correlation
Above 10,000	20	.962
5,000 to 10,000	13	.902
3,000 to 5,000	14	.781
2,000 to 3,000	12	.918
1,000 to 2,000	25	.861
Entire Group	84	.905

The change in the coefficient of correlation obtained for the entire group from .908 to .905 is very small, although larger changes were found in the figures for the small groups. Chart II shows the relationship between the two series for the year 1931. It will be noted that the horizontal scale runs to 1,500 on the 1931 chart and to 1,900 on the 1936 chart because of the growth in average consumption per customer over the five-

⁹ But this line shows only the generalized experience, the actual values are scattered on each side of this single line. For that reason the two dashed lines are shown. Their positions have been determined by means of the scatter formula $S_r = \sigma_r \sqrt{1-r^2}$ and between them

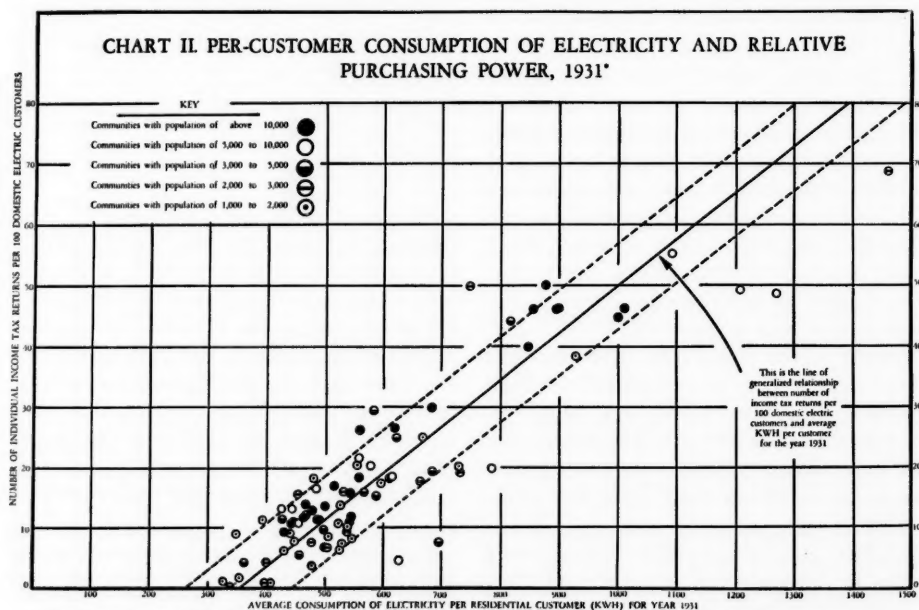
lies the area in which approximately 68% of the actual values encountered would fall if we assumed that the cases chosen were from a group having rate level, appliance prices, promotional policies, and competition similar to the group studied.

year period. This indicated that very high correlation should obtain between the net gain in average consumption (kwh) per customer by towns and the original income tax series. These two series were correlated with the following results:

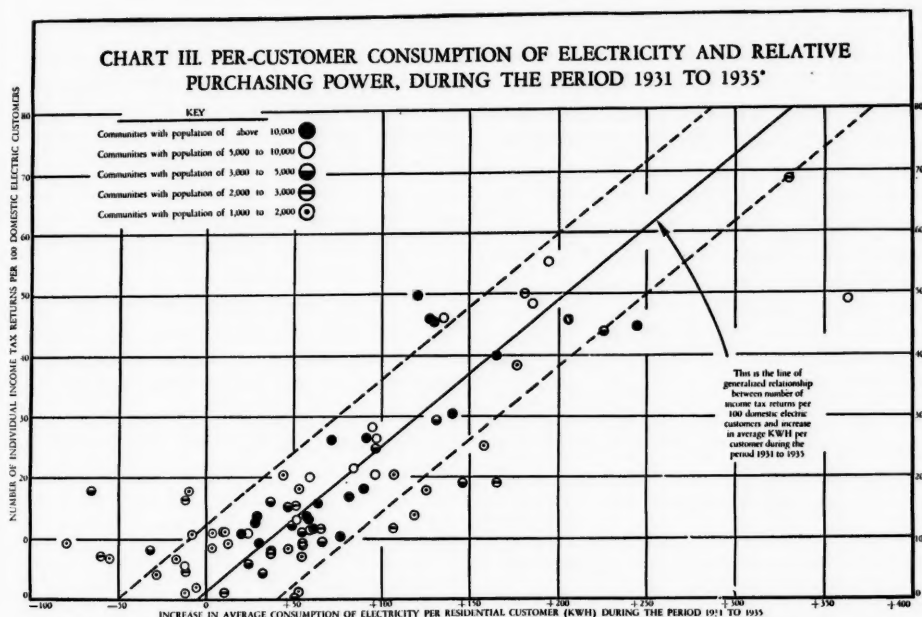
Population Group	Number of Cases in Each Group	Coefficient of Correlation
Over 10,000	20	.838
5,000 to 10,000	13	.872
3,000 to 5,000	14	.708
2,000 to 3,000	12	.847
1,000 to 2,000	25	.668
Entire Group	84	.805

The relationship is not as strong as that obtained in the previous instances, although a high positive correlation is present. The data used have been studied carefully but no definite reason can be given for the reduction in degree of relationship. The following is offered as a possible explanation of part of the difference. After the series for 1931 and 1936 had been correlated, data were prepared for the years between. From these

data it soon became apparent that rates of growth of the various communities were quite different from year to year. When the communities were classified roughly into five purchasing-power groups, it appeared that the average customer in the highest group increased his consumption at a moderate rate year after year, the rate being higher in good years than in depression years. The average customer in the low-purchasing-power group, on the other hand, reduced his average use drastically in depression years; then in good years increased it at a rate much greater than that of customers in the first group. It appeared, however, that over the entire business cycle the average consumptions of the groups tended to come back into balance. The period from 1931 to 1936 does not include an entire business cycle and it is possible that the growth of all the towns has not come into balance. The close relationship between the growth in average use of electricity over the five-year period and relative pur-



* The measure of relative purchasing power used here is number of income tax returns per 100 residential electric customers.



* The measure of relative purchasing power used here is number of income tax returns per 100 residential electric customers.

chasing power is shown on Chart III.

The income tax series was correlated with average consumption of gas per residential customer, and also with number of automatic gas water heaters per 100 domestic customers as well as number of central gas-fired house-heating installations per 100 domestic customers. In each case high positive correlation was found, but in the case of the two appliance series (water heaters and house-heating installations) very great care had to be used in selecting the bases for the ratios used. For example, automatic gas water heaters and gas house-heating installations are found almost entirely in single-family homes, with a few in two-family dwellings. For this reason the series of ratios gave best results where the divisor used was based on number of customers in one-family, or one- and two-family dwellings.

The results thus far presented may cause the reader to wonder how it is possible to obtain high positive correlation for both average consumption of

electricity (kwh) per domestic electric customer and average consumption of gas per domestic gas customer, for it seems as if high average electric consumption might be secured, to some extent at least, by displacement of gas-consuming appliances. This thought suggested correlation of average electric and gas consumptions by towns. The calculations were made for the years 1931 and 1936 and in each of these years high positive correlation was found, the values being .901 and .913 respectively. This may not be a universal relationship, however. It applies to the group of towns studied because rates and sales policies for both gas and electric service have been uniform throughout the entire territory. The relationship will undoubtedly be different where different situations are encountered.¹⁰

¹⁰ However, if we visualize a low purchasing-power town, not as one in which there are no customers able to purchase, for example, a new electric range to replace a gas range, but instead as one in which there is relatively a smaller number of such customers, it appears

(Footnote 10 continued on page 358)

Conclusions

After full consideration of the material presented above and other analyses not included here, it appears that the number of individual income tax returns filed in a community is a good indication of the relative purchasing power of the community, in the narrower sense adopted for purposes of this study. This index is simple to apply and the data have been or can be made available for all incorporated communities above 1,000 population. Some further study will be necessary to determine whether or not certain adjustments will be needed to make the index adaptable with respect to all communities in the United States. Reasons will occur to the reader why an index such as the one constructed here would not apply universally without introducing error. Reference to the charts will show that the relative purchasing power of each community was determined on the basis of its ratio of individual income tax returns to number of domestic electric customers. After considering the situation that exists, for example, in certain communities where a great many homes are without electric service and the number of income tax returns is small, it may be that a different ratio will have to be adopted, perhaps one based on population. Again, number of income tax returns tends to be higher in communities near large urban centers, such as New York, Chicago, and Detroit, where wages, salaries, and costs of living are high. As a result, an index based directly on the ratio of individual income tax returns to either total number of domestic electric customers or total pop-

ulation may tend to rate smaller, isolated communities enjoying low living costs farther down the scale, when actually the standard of living and ability to purchase utility service are higher than in the former type of community. Without doubt, when the study is extended to include communities in other rate areas, methods of refining the index will be suggested.

Two tentative conclusions can be drawn from this analysis: (1) where rates, competition, and sales policies are similar, per-customer consumption of electricity is directly proportional to relative purchasing power (in terms of relative number of income tax returns), and (2) per-customer consumption of electricity is in itself a good index of relative purchasing power¹¹ of a community, other factors being equal. The implications of these two conclusions are very great, particularly in the case of the latter. However, it is not directly concerned with the present problem as is the first.

Of what value is it to know the relationship of purchasing power to electricity consumption? The value lies in the fact that with this information it will be possible to group communities having similar purchasing power and study the effect of various rate levels and sales policies on average consumption. There was a time when interest in this question was purely academic. That was back in the pre-depression years, when a broad profit margin protected credit and stability if rate and sales policies proved to be less productive than expected. Many factors have operated to reduce the industry's profit margin, chiefly the continuing rate reduction program, the effects of maturity

(Footnote 10 continued from page 357)

that displacement of one service by another would occur at such rates in the various communities that the relative position of any one town so far as average use of both services is concerned, would remain unchanged.

¹¹ The term "purchasing power" is used here in the broad sense instead of in the restricted sense adopted for the purposes of this study.

of the industry,¹² and the increases in basic operating costs—labor, material, taxes. This last factor is one of the strongest arguments for careful analysis of effects of pricing and sales policies. It is no longer possible to offset the effect of cost increases by the old methods—*i.e.*, by increasing operating efficiency and increasing load factor. Instead, the industry must look for increases in marketing efficiency. It must study the elasticity of its various markets. It must

evaluate proposed rate changes in the light of their probable productivity, which means simply the extent to which the rate change will stimulate increases in sales at a profit.¹³ It must study the relative effects of price changes and promotional effort so that increases in new business can be obtained most economically, to the ultimate advantage of the company and the rate payer. Altogether the results obtained so far in this work encourage further study.

¹² Evidences of maturity are seen in the slowing-up in rate of cost reduction resulting from increased operating efficiency and increases in load factor, and in the increasing exploitation of marginal markets, such as those

for rural service, electric range and water heater business.

¹³ This statement assumes close coordination of market and cost analyses for greatest benefit.

An Appraisal of Farm Land Assessments

By R. R. RENNE* and H. H. LORD†

FAR-REACHING adjustments in the use of land resources are occurring in many sections of the United States. This is particularly true in the Great Plains where social and economic maladjustments resulting from settlement of low-grade arid lands have caused human poverty and deprivation, soil and range depletion, and widespread economic bankruptcy. The present excessive burden of farm taxes stands out as a monument to such unwise settlement.

Superimposed upon these arid prairies is a public debt and a superstructure of governmental services which would better fit the fertile acres of the Middle West. Not only is the burden of taxes generally out of line with the tax-paying ability of the land, but the burden is so distributed that a disproportionate amount of it is carried by the lands which can least afford to pay. As a result, tax delinquency, tax deed, and mortgage foreclosures, farm tenancy, improper land use, and related farm problems are becoming more and more acute.

The findings presented in this paper are based upon an analysis of farm land assessments in Montana, but they are quite generally applicable to a large portion of the Great Plains and probably to some other areas in the United States as well. The history and background of

Montana's assessment system, together with the inequalities growing out of it, illustrate the haphazard and unscientific methods used, and the resulting inequitable distribution of farm taxes which is so general. It is hoped that, by bringing the glaring defects in assessments together with suggestions for their correction to the attention of students of land economics, a more scientific and equitable assessment system may ultimately be established.

History of Assessment in Montana

All property in Montana prior to 1919 was required by law to be taxed according to its full cash value. This value as defined by law meant the amount at which the property would be taken in payment of a just debt from a solvent debtor. This full cash or sale value was intended to be the base upon which the tax rate was levied to determine the taxes due from a given property holder. In other words, \$1,000 worth of farm land and improvements was supposed to pay the same amount of taxes as \$1,000 worth of live stock, household goods, merchandise, money in the bank, or any other form of property, tangible or intangible.¹ There was no recognition of differences in ability to pay among different types of property.

This was changed in 1919 when a law

levies are uniform. The millages levied on property vary greatly among school districts and among counties which, of course, causes significant differences in taxes paid by the same amount of property in different governmental units. In this paper the analysis of "assessment" will be limited to the valuations placed upon property and upon which the millages are levied. It will not deal with tax inequalities resulting from differences in millage levies among school districts or counties which reflect, in part, differences in the extent and type of public services supplied by these governmental units.

* Head of the Department of Economics and Sociology, Montana State College and Agricultural Economist, Montana Agricultural Experiment Station.

† Research Assistant, Montana Agricultural Experiment Station and Assistant State Supervisor of Rural Research, Division of Finance, Research, and Statistics, Federal Works Progress Administration.

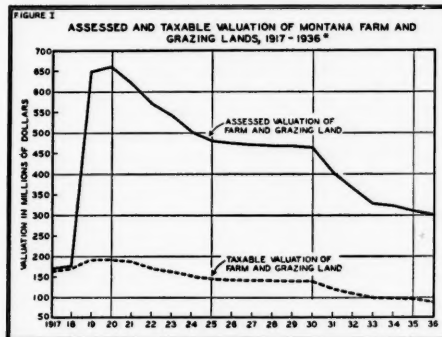
Contribution from Montana State College, Agricultural Experiment Station, Paper No. 95, Journal Series.

¹ This is, of course, assuming that such property is within the same governmental unit so that the millage

was passed requiring property to be divided into seven classes, each carrying a different percentage of the full and true value which was to be used as the basis upon which the tax millages were to be levied.² Farm land and improvements were placed in Class IV and 30% of the full and true value instead of 100% was to be used as the taxable value. Moreover, all farm land was to be classified into different classes or grades of irrigated, non-irrigated tillable, grazing, timber, and mineral lands, and tax assessments were to be based on such classification. The county commissioners were authorized to employ appraisers to survey and classify the lands and to levy funds for paying the cost of such classification, which they did. In some counties a fairly good job was done for that period, but in most of them a poor job was done all too hastily by unqualified men. The classifications as a whole lacked uniformity and were superficial and unscientific. For example, lands were classified as farm lands if their topography was suitable for farming regardless of whether the soil was really capable of producing profitably under cultivation.³

When the 1919 law was passed, assessors in most cases merely tripled the assessed value (the supposed full cash value) of land and improvements so that the new taxable valuation (the value upon which the tax millages were levied) on the 30% basis under the 1919 law

would be the same as the old taxable valuation under the 100% basis (Figure I). The assessed value and taxable value were one and the same thing prior to 1919, but under the classification law the taxable valuations for the different classes of property were equal to a given percentage of the full cash (assessed) value as indicated in footnote 2. This was done because landed property made



* The assessed valuations were more than tripled in 1919 when the classification law went into effect in order to maintain taxable valuations.

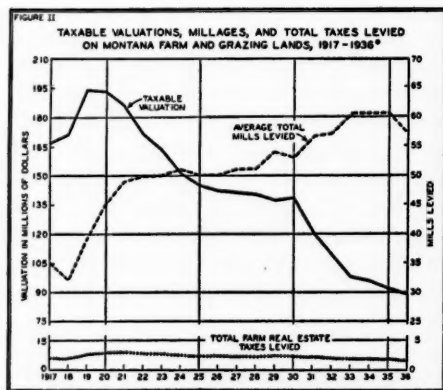
up such a large proportion of the total tax base that by doing this the same revenue could be obtained without immediately necessitating huge increases in the millage levies. In spite of the fact that assessments of landed property, particularly farm and grazing lands, have been greatly reduced with falling prices since 1921, nevertheless the taxable valuation of the other six classes,

² Class I—the annual net proceeds of all mines and mining claims were to be taxed on 100% of their full and true value; Class II—all household goods and furniture, all personal property, all agricultural and other tools, implements and machinery, automobiles and trucks, etc., 20%; Class III—live stock, poultry, and stocks of merchandise of all sorts, 33⅓%; Class IV—all lands, town and city lots, with improvements, and manufacturing and mining machinery, 30%; Class V—all moneys and credits, excluding banking capital, 7%; Class VI—moneyed capital employed in conducting a banking business, 40%; Class VII—all property not included in the preceding classes, 40%.

³ A member of the State Board of Equalization recently related to the authors the following story which well illustrates the unscientific manner in which the lands were classified. He stated that while visiting a central Montana county the assessor referred to "Injun" land, and the State Board member knowing of no Indian land in the county was curious to know what the assessor had meant. Upon inquiry he found that the term referred to "engine" land, one of the classes used to denote all land that could be plowed with a tractor. Another class included lands that could be plowed with horses, and still another included lands that were considered "non-tillable."

taken as a whole, has declined relatively more as is evidenced by the fact that Class IV (land and improvements) made up a larger percentage of the total taxable valuation of all property in 1936 than ever before.

The increase in millage levies in recent years which has accompanied the decline in taxable valuations has been sufficiently large to offset, to a large extent, the reduction in assessed valuations. Consequently, the amount of taxes levied against farm and grazing lands has not declined nearly as much as the lowered assessments would seem to indicate (Figure II). This continuance of a rather high level of taxes on landed property during the depression years has called forth such proposals for tax relief as exemption of homesteads from taxation, and has called attention to the serious need of an assessment system which will assess the lands uniformly in proportion to their relative abilities to pay.



* Reductions in taxable valuations have been offset to a large extent by increases in millage levies.

In most counties the classifications of farm and grazing land are maintained from year to year with a few minor exceptions. Changes are sometimes made, however, where a farmer insists

he no longer farms a given piece of land. In such cases the assessor may reclassify the land into a grazing category. During depressions when general prices decline or in periods of low income caused by drouth, insect damage, etc., farmers insist their taxes must be reduced and the assessor may make flat reductions of 10, 20, or 30% in the assessed value on all grades of farm and grazing lands in his county. (Assessors are supposed to assess land at its full and true cash or sale value which undoubtedly declines during such periods.) Since all lands receive the same rate of reduction, any inequalities in assessments among the different grades are not corrected. Moreover, as was shown above, the reduction in assessment does not necessarily guarantee a similar reduction in taxes because the millage levies may be increased.

Effectiveness of Equalization Machinery

A State Board of Equalization was created in Montana by legislative act in 1923, with the authority "to do all things necessary to secure a fair, just, and equitable valuation of all taxable property among counties, between different classes of property and between individual taxpayers." The board of county commissioners in each county is also authorized to sit as a board of equalization for the county. If any taxpayer is dissatisfied with the way his property has been assessed by the county assessor or his deputy, he can appeal to the county commissioners who act as a county board of equalization from the third Monday in July to the second Monday in August of each year. The taxpayer in making his appeal presents his arguments showing why he feels his assessment should be reduced. In the case of farm or grazing land he may argue that the classification was not correct in the first place or that it puts

too high a value on his land. The county board after considering the case may grant his appeal and order the assessor to reduce the assessment, or they may refuse to change the assessment made by the assessor, or they may actually increase the assessment, which has occasionally been done.

If the taxpayer is not satisfied with the action taken by the county board he may appeal to the State Board of Equalization. The State Board after considering the case may grant the appeal and order the county commissioners to have the assessment changed, or they may refuse to change it.

In order to ascertain the extent to which this equalization machinery has been utilized, assessment changes by county boards of equalization in 12 selected counties were analyzed. During the five-year period 1932 to 1936 inclusive, a total of 1,252 applications were made to the county boards (Table I), or an average of 251 applications a year in each county. The 1,252 applications involved 382,465 acres which is less than 3% of the total deeded farm land in these counties. It should be pointed out that these adjustments do not include the indiscriminate raising or lowering of the assessment of all lands which has been made in some counties. An increase or decrease in the assessment of all lands regardless of their real value, while it may represent an equalization among

types of property and among counties, cannot be regarded as an equalization of assessment among agricultural lands within a county. The overassessed land is still overassessed in the same proportion.

A similar analysis was made of changes in assessments by the State Board of Equalization. Out of 428 appeals for adjustments to the Board during the five years 1932 to 1936 inclusive, 204 were denied. The 224 changes which were made involved 319,575 acres which is only 6/10 of 1% of the total deeded agricultural land in the State. The number of assessment changes averaged only 45 per year during these five years, whereas there are 50,564 farmers in Montana according to the 1935 Census, and some 183,000 different individual agricultural land ownership assessments in the State.⁴ Total reductions in assessed valuations made by the State Board during the five years amounted to \$687,980 (Table II), which is less than 2 1/2% of the 1936 total assessed valuation of farm and grazing lands in the State.

Approximately 3/4 of the deeded farm land in the State is owned by individuals and about 1/4 by corporations. On the other hand, of the lands upon which the assessment has been reduced, about 1/2 is owned by individuals and 1/2 by

⁴ See "Montana Land Ownership," *Montana Experiment Station Bull.*, No. 322, June, 1936, p. 36.

TABLE I. CHANGES IN ASSESSMENTS BY COUNTY BOARDS OF
EQUALIZATION IN 12 SELECTED MONTANA COUNTIES*

Year	No. of Changes	No. of Acres	Previous Assessed Value	Revised Assessed Value	Amount Reduced	Per cent Change
1932	320	115,936	\$1,415,994	\$1,070,677	\$345,317	24%
1933	127	36,282	379,305	316,647	62,658	17
1934	209	48,690	638,195	479,542	158,653	25
1935	222	59,912	893,838	771,049	122,789	14
1936	374	121,645	1,213,395	998,018	215,377	18
Total	1,252	382,465	\$4,540,727	\$3,635,933	\$904,794	20%

* Compiled from reports submitted by clerk and recorders in the following counties: Beaverhead, Chouteau, Fergus, Gallatin, Hill, Lake, Musselshell, Phillips, Prairie, Ravalli, Richland, and Teton.

TABLE II. CHANGES IN ASSESSMENTS MADE BY THE MONTANA STATE BOARD OF EQUALIZATION*

Year	Denials	No. of Changes	No. of Acres	Previous Assessed Value	Revised Assessed Value	Amount Reduced	Per cent Change
1932	113	32	21,967	\$ 171,248	\$ 124,497	\$ 46,751	27%
1933	29	44	64,878	567,420	368,241	198,979	35
1934	4	29	36,828	287,730	194,301	93,429	32
1935	34	26	18,165	128,877	91,044	37,833	29
1936	24	93	177,737	1,296,806	985,818	310,988	24
Total	204	224	319,575	\$2,452,081	\$1,763,901	\$687,980	28%

* Compiled from records of the Montana State Board of Equalization, Helena.

corporations. These data are presented not as a criticism of the corporations owning land in Montana nor of the State Board of Equalization, but to show that it is not necessarily the most deserving land which is receiving reductions in assessment with the present equalizing machinery. On the contrary, it is the individual or corporation which takes the initiative of applying and which has the legal talent available to present its claims effectively, that is gaining what is probably well deserved assessment reduction. At the same time there are thousands of individual land owners in the State whose land is over-assessed and who, as we shall see shortly, have not yet taken, and who probably will not take, the initiative in applying for a reduction. The present operation of the equalization machinery is probably adding to the inequalities in assessments rather than correcting them. It would seem that the responsibility of obtaining equality of assessment should not rest on individual initiative and the ineffective method of appeal, but the procedure should be so written in the law and so administered that assessments would be established on a truly scientific basis.

Inequalities Indicated by Ratios of Assessed Values to Sale Values

The Montana classified property tax law states that "all property must be

assessed at its full cash value" which, as indicated previously, means the amount at which the property would be taken in payment of a just debt due from a solvent debtor. In other words, the full cash value means what it would bring at a voluntary sale. Assessors, therefore, are supposed to be guided in setting their assessment values by the values established through voluntary sales of the different grades of land. However, in view of the fact that less than 10% of the taxable farm land in Montana (and in most other states as well) has been sold voluntarily during the past 10 years, it would seem that county assessors have been given a difficult task. Not only must they determine which transfers represent the "full and true cash value" of the land, but they must assess the remaining 90 or 95% of the land which has not been transferred.

The small amount of farm land which has changed hands through voluntary sales, particularly in more recent years, is not the only condition which raises doubts as to the validity of using "sale value" as a basis for assessment. Not only is sale value too often unavailable, but periods of optimism and depression and speculative forces frequently so affect the sale value of land for temporary periods, that sale value does not represent the reasonable or real economic value of the land.

In spite of the fact that productivity

value (see the discussion below) is a better basis for tax assessments than sale value, the latter is, at least according to law, the present basis for assessment in Montana, and in many other states as well. Consequently, in order to determine the degree to which assessments are in keeping with the letter of the law, an analysis was made of the relationship of sale value (established through voluntary sales) to assessed value. Inequalities in assessment are expressed in terms of the ratio of assessed value to sale value. A ratio of one indicates that the sale value and the assessed value are equal; a ratio of less than one, that the property is under-assessed; and a ratio greater than one, that it is overassessed.

An analysis was made of more than 5,200 voluntary sales of farm land covering the period 1919 (when the classified property tax law was effected) to 1935 inclusive in 19 selected counties. The average ratio of assessed value to sale value for the entire sample was found to be 1.09 or, in other words, the lands were found to be slightly (9%) overassessed. However, the ratio varied considerably from year to year, the range being from an average underassessment of about 4% in 1919 and 1928 to an overassessment of some 30% in 1932. This in-

dicates the tendency of assessment values to rise slower than sale values in prosperous or rising price periods, and to fall slower during depression or falling price periods. A similar analysis of more than 5,400 voluntary sales of farm land covering the period 1919 to 1930 inclusive in 42 counties, gathered by the research department of a private company and made available to the authors for analysis, gave fairly comparable results.

A very definite relationship was found to exist between the size of holding as measured by value and the ratio of assessed value to sale value. It was found that the smallest holdings were the most overassessed and the largest holdings were the most underassessed (Table III). The average ratio of assessed value to sale value for properties of less than \$500 was 3.51 (very serious overassessment), while for properties of more than \$10,000 the ratio was .62 (underassessment). Similar results were found from an analysis of the private agency's sample.

When size of holding is measured on an acreage basis it was found that these large inequalities disappeared. In fact, the smaller acreages tended to be slightly underassessed and the largest acreages slightly overassessed. For example, hold-

TABLE III. AVERAGE RATIOS OF ASSESSED VALUES TO SALE VALUES IN SELECTED MONTANA COUNTIES BY SIZE-VALUE GROUPINGS*

Sale Value	No. of Voluntary Transfers	No. of Acres	Assessed Value	Sale Value	Ratio of Assessed Value to Sale Value
\$ 0- 500	1,089	118,317	\$ 857,067	\$ 244,441	3.51
501- 1,000	948	180,579	1,288,106	668,141	1.93
1,001- 2,000	1,211	271,385	2,427,951	1,673,837	1.45
2,001- 3,000	721	190,404	2,089,297	1,672,124	1.25
3,001- 5,000	691	193,231	2,551,302	2,576,388	.99
5,001-10,000	369	122,303	2,102,483	2,401,737	.88
10,001 & over	146	118,115	1,658,501	2,691,067	.62
Total	5,175	1,194,334	\$12,974,707	\$11,927,735	1.09

* The data cover voluntary sales of farm lands during the period 1919 to 1935 inclusive for 19 selected counties which, taken as a group, are believed to be fairly representative of the State as a whole. They were compiled from deed and assessment records in these counties.

ings of less than 40 acres were assessed at about 80% of sale value (a ratio of .80), while holdings of 960 acres or more were assessed at about 8% above sale value. The smallest acreages represent for the most part irrigated lands, with relatively high valuations. There is a definite tendency for assessors to under-assess the higher valuation lands (see the following section on "Inequalities Measured by Ratios of Assessed Values to Productivity Values") and this largely explains the relatively greater underassessments for the smaller acreages.

Considerable differences were found to exist among counties in the average ratio of assessed value to sale value. In some counties the average assessment is from $\frac{1}{3}$ to nearly $\frac{1}{2}$ too high, while in others it is around $\frac{1}{4}$ too low.

The above ratios represent averages in every case and do not indicate the great variations in assessment ratios among individual property owners within the different counties for the various years. For example, in some counties it was not uncommon for ratios of assessed value to sale value among individual properties to range from .25 (or $\frac{1}{4}$ of the sale value) to 9.00 within the same year. In other words, some individuals were being assessed 9 times too much, according to the law, and some 4 times too little. In some cases the ratios showed great extremes, varying from less than .10 to more than 25.00 within a county for the same year.

The foregoing analysis indicates that,

⁵ The following are some of the studies in which the sale-value basis has been used to measure assessment inequalities: (1) 1924—"Tax Revision in Kansas," by Eric Englund, *Kansas Sta. Bul.* 234; (2) 1927—"Relation of Tax Value to Sales Value of Farm Land," *Ohio Sta. Bul.* 402, pp. 103-109; (3) 1928—"A Study in the Ratios of Assessed Value to Sales Values of Real Property in Oregon," by W. H. Dreesen, *Oregon Sta. Bul.* 233; (4) 1935—"Sales Value and Assessed Value of

under the present method of assessing Montana farm lands, assessments do not correspond uniformly with sale values. In other words, using sale value as the measure of "full and true value," great inequalities in assessments exist among different sized holdings, among counties, and among individual property holders within the counties.

The explanation of why present assessments do not correspond with sale value in spite of the provisions of the assessment law, may be any or all of the following: (1) absence of voluntary-sale data or any reliable information upon which the assessor or his deputies could base their valuations; (2) belief on the part of the assessor that sale value does not represent the "full and true value" of the land; (3) the necessity of making high assessments to maintain the tax base so that, with the maximum levies allowed by law, the desired tax income can be obtained to operate government services; or (4) other economic or political factors such as favorable reductions or low assessments to the bigger and more influential property owners. It is difficult to say just which of these four is the best explanation because one may be the explanation of most of the inequalities in certain counties or areas, and another in others. Each is important in accounting for inequalities under our present assessment system.

The inequalities discovered in this study are substantiated for the most part by similar studies made in other states by other workers.⁵ In spite of the fact that many such studies have been

Nebraska Farm Land, 1921-1934," by E. H. Hinman, *Nebraska Sta. Res. Bul.* 77; (5) 1936—"Inequalities Arising from the Assessment of Farm Real Estate in South Dakota," by R. B. Westbrook and N. V. Strand, *So. Dakota Sta. Bul.* 300; and "Ratio of Assessed Value to Consideration of Bona Fide Transfers of Farm Real Estate," U. S. Dept. of Agric., Bur. of Agr. Econ., Mimeographed.

made on the general assumption that the ratio between assessed value and sale value represents a fairly reasonable basis of measuring assessment inequalities, the results of the sale-value analysis are presented here primarily to show that the provisions of our present assessment law are not being complied with and for the reasons indicated. This study also attempts to go a step farther in pointing out what the authors believe is a more scientific and reasonable basis to measure assessment inequalities—namely, productivity value—and to suggest plans by which such a basis may be adopted.

*Inequalities Indicated by Ratios of
Assessed Values to Productivity
Values*

In the long run the most reasonable basis for determining what land is worth is its ability to produce an income. This is particularly true in Montana and most of the Great Plains where farming is more commercialized than in many other areas. In other words, a reasonable value based on its productivity is the long-time earning power or the economic rent capitalized at a reasonable rate of interest. For example, if we assume 5.5% to be a fair return on an investment or a fair rate of interest, an acre of land that will provide an annual return of 55 cents above all other costs is worth \$10.

The first step in determining productivity value is to classify the lands into different economic grades based on soil survey, topographical, climatic, and production data. In the case of Montana

the lands have been grouped by the Montana Experiment Station into four grades of farm land and five grades of grazing land. The productivity of farm land is expressed in terms of the yield of spring wheat which normally can be expected (using an alternate summer fallow system). The grades are as follows: first grade farm land, 22 bushels or over per acre; second grade, 16 to 21 bushels; third grade, 12 to 15 bushels; and fourth grade, 8 to 11 bushels.⁶

Grazing land is classified according to its carrying capacity, which is expressed in terms of the number of acres required to graze a 1,000-pound steer for a 10-month grazing season. There are five grades, which are as follows: first grade grazing land, 18 acres or less per steer; second grade, 19 to 27 acres; third grade, 28 to 37 acres; fourth grade, 38 to 55 acres; and fifth grade, 56 acres or more per animal.

The above yield and carrying-capacity data must next be converted into acre values. In other words, on the basis of such productivity data, what is each grade of farm and grazing land worth per acre? It is worth the amount upon which the land, on the average, will yield a fair rate of interest over and above costs of production including taxes, family living expenses, and other necessary expenditures. A study of ranch operating costs in different parts of Montana indicates that, if all land is owned, a ranch operator can afford to invest on the average \$50 to \$60 per cow and \$12 to \$15 per ewe in land and improvements.⁷ According to this method

⁶ An analysis of wheat-yield records submitted by farmers on wheat-allotment applications under the Agricultural Adjustment Act in a sample area comprising some 1,210,000 acres covering parts of 6 counties indicates that, with the exception of second grade land, the various grades have produced approximately the yields credited to them. Except for one area, second grade farm land has also yielded as credited. These data cover the eight-year period 1928 to 1935 inclusive.

Precipitation is a very important factor determining crop yields in this area. During the eight years covered by the data the average precipitation was 13.43 inches per year which is nearly 2 inches less than the 44-year average of 15.23 inches.

⁷ See "Readjusting Montana's Agriculture: V, Economic Changes in Montana's Livestock Production," *Montana Expt. Sta. Bul.* No. 311, Feb., 1936.

of capitalization, the maximum value of the different grades of grazing land based on their carrying capacity as indicated above and on long-time average prices is as follows: first grade, \$3 per acre; second grade, \$2.50; third grade, \$1.50; fourth grade, \$1.00; and fifth grade, \$.75.⁸

The productivity value of first, second, and third grade farm land is determined from the net return to land used in a straight summer fallow-wheat rotation, capitalized at the rate of 5.5%.⁹ Fourth grade farm land has been valued as third grade grazing because this grade, with average wheat prices, is not profitable for farming and has a greater comparative advantage in grazing.

The size of the farm unit used as a basis for determining the cost of operation on these different grades of land is 800 acres for first grade, 1,000 acres for second grade, and 1,100 acres for third grade.¹⁰ Eighty cents per bushel is used as the price of wheat in computing the long-time expected annual gross income on the various grades of farm land.

The approximate values computed for the four grades of farming land according to the above procedure are, in round

numbers, as follows: first grade farm land, \$35 per acre; second grade, \$18; third grade, \$3; and fourth grade, \$1.50.

The productivity value of the land in a sample area comprising approximately 1,210,000 acres covering parts of six counties was determined by the above procedure. The 1936 assessed valuations of these lands were then obtained and the ratio between assessed values and productivity values computed. An analysis of the ratios thus computed shows that a considerable portion of the land is being assessed at four times its productivity value, others at less than $\frac{1}{2}$. Taking the sample area as a whole, the ratio of assessed value to productivity value averaged 1.05, but the ratios commonly ranged from as low as .30 on some parcels to more than 5.00 on others. Among the most glaring inequalities which were found to exist were those among the different grades of land and those among counties.¹¹

Inequalities among grades of land were by far the greatest of any which occurred in the assessment of either farming or grazing lands in the sample area. Figure III indicates that the ratio of assessed value to productivity value

⁸ The average farm price of beef for the 40-year period 1890 to 1930 was used to calculate the expected average net returns to the land. For details of method, ranch operating cost items, etc., see Saunderson, M. H., "Some Materials Relating to Livestock and Land Valuation," Mimeographed; or Saunderson, M. H. and Bolster, H. G., "Lease Value of Montana Range Lands," Mimeographed.

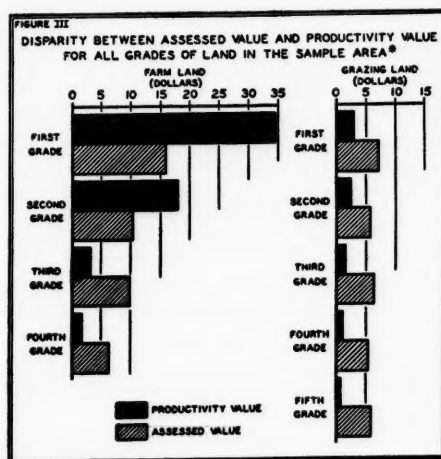
⁹ A preliminary analysis of Montana farm mortgages indicates that about $\frac{3}{4}$ of the strictly real estate mortgages on farm lands are held by the Federal Land Bank. The combined interest and carrying charges on these mortgages is in most cases 5.5% of the principal.

¹⁰ These acreages do not correspond to acreages in present farm units on these grades of land, but are considerably larger. They are considered more in keeping with probable best use of the land. If the productivity value of Montana farm lands were computed on the basis of present average sized farm units and average prices, only first grade land would have any value, it being the only grade which, on the average, provides a return on the capital invested after a reasonable allowance for family living costs and other operating expenses

are deducted from the gross return. Under Montana dry land farming conditions where large-scale farm machinery is used on nearly all farms, there are often small areas of farm land which, because of topographical obstructions or ownership boundaries, are better adapted to grazing than to cultivation. Also, among the lower grades of farm land, low productivity and the increasing soil-blowing menace promise to force a reversion of some of the land hitherto used for farming into grazing. Consequently, in computing the average productivity value of the different grades of farm land, some of the acreage has been valued as grazing land. After careful study of farming conditions and recommended land-use practices, the following proportion of the acreages used as operating units for the different grades has been valued as grazing land: first grade farm land, $\frac{1}{4}$ valued as first grade grazing; second grade farm land, $\frac{1}{2}$ valued as second grade grazing; and third grade farm land, $\frac{1}{2}$ valued as third grade grazing.

¹¹ Lesser inequalities were found to exist among school districts, among lands of the same grade devoted to different uses, and among the different sized units.

bears a direct relationship to the grade of land, the poorer grades of land being progressively overassessed. First grade farm land is consistently assessed at less than $\frac{1}{2}$ its productivity value, second grade at less than $\frac{3}{8}$, while all other grades of farming and all grades of grazing land are overassessed, the ratio of assessed value to productivity value averaging about 3 to 1.



* Note that the first and second grade farm lands are underassessed, while all other grades are overassessed.

An analysis of the relation between assessed value and productivity value for sample lands taken at random from the 21 counties in which a soil survey has been completed and the land classified into various economic grades in Montana, shows a disparity almost identical to that in the sample area. This indicates that inequality in assessment among grades of land is general.

Two principal weaknesses in the present system of assessing farm lands seem to be largely responsible for the inequalities among the various grades: (1) lack of an adequate classification of lands for assessment purposes, and (2) lack of information and appreciation

relative to the economic value of the different grades of land.

The second most important type of inequality is the disparity in assessment of lands of the same grade in different counties. An analysis of the assessment of farm lands in the portions of the six counties included in the sample area indicates that among these six there is a variation of more than 30% above (a ratio of more than 1.30) to more than 25% below the average assessment (a ratio of less than .75). The grades of land in each county were compared only with the same grades of land in the other counties.

Apparently the need for revenue in the different counties and the peculiarities in the judgment of the different county assessors and their deputies rather than productivity value are the factors which determine the assessed value of farm land in the sample area. Sample data from the 21 counties referred to above indicate that inequalities among counties are even greater in some cases than those indicated by the study of the sample area.

Causes of Assessment Inequalities

The above analysis indicates that, under present methods of assessing Montana farm lands, assessments do not correspond uniformly with either sale values (the legal requirement) or with productivity values. The latter inequalities appear particularly serious, especially the apparently consistent practice of overassessing the poorer grades of land. The maladjustments resulting from this failure of assessments to tally with productivity values—the best available measure of ability to pay—are important factors contributing to tax delinquency and related problems, the growth of farm tenancy, and improper use of land.

Several reasons explain why present assessments do not correspond with productivity values. (1) It is impossible for the average assessor (who is selected by popular vote) with the usual amount of training to distinguish accurately between the various grades of land by casual observation. A trained soil scientist is necessary to make a scientific soil classification upon which an economic analysis can be based on farm management and production data, and from which the worth of the lands under existing prices and conditions can be determined. (2) Even where the assessor possesses a scientific soil classification and economic grade map and attempts to use it, political expediency too frequently forces him to assess lands nearer to what the people of his county think the different lands are worth than strictly according to the land classification. People habitually overrate poorer grades of goods generally, including land, and underrate the best. It is difficult to convince most people that the comparatively large spread in values between the best and poorest grades, particularly of farm land, is really justified. (3) In low taxable valuation counties with a high percentage of poor land the need for revenue has caused values to be maintained at a high level. The usual response of county officers to complaints of taxpayers in such areas is that it doesn't help any to reduce assessments because just so much money is needed to run the county business anyway, and if the assessments are lowered the millages will have to be raised. This, of course, ignores the problem of inequalities in assessments among individual property holders. (4) The practice of assessors to zone and assess lands according to their distance from the county seat or shipping points causes lands of the same grade closer to such points to be assessed

higher than corresponding grades further removed from said points. In some cases, such disproportionate weight is accorded location that the differences in values attributed to situs are greater than those attributed to productivity or grade. With modern means of transportation and good roads, distance from market plays an increasingly less important place in the determination of land values, and should not be given the weight now accorded it by assessors. Particularly is this true in a state such as Montana (and several others of the Great Plains states) which has no large consuming centers or terminal markets and where the type of farming is such that a few additional miles to the shipping point do not add materially to the cost of marketing. (5) The large number of individuals who assess land in the different counties, with no central coordinating agency to establish uniform standards for classification and valuation of land, necessarily results in great variations in assessments.

Conclusions

Inequalities in assessment are attributable jointly to flaws in (1) the assessment system and its legal basis and (2) the administration of the law. The 1919 law placed the duty of assessing property including farm lands, as well as the duty of having lands properly classified, in the hands of the counties. In view of the fact that a fair assessment depends jointly upon an accurate and uniform land classification and upon a scientific and uniform determination of values based thereon, it seems that placing the duty of classification and assessment in the hands of the counties is a mistake. An accurate and uniform land classification requires the closely coordinated work of a staff of trained soil surveyors. The counties could not maintain such a staff individually nor could

the work done by the different counties be uniform.

According to the Montana law, farm lands are to be assessed according to their "full cash value." This basis has, in fact, left the assessors without a factual basis for determining land values. The result has been that political expediency, need for revenue, and the peculiarities in the judgment of the different county assessors have largely determined the assessed valuations. The use of "productivity valuations," computed from soil survey, yield, land use, and price data on the one hand, and from farm cost data on the other, provide a factual and equitable basis for assessed valuations.

In view of the inability of most county governments to make and maintain an adequate land classification or to gather and use the data necessary in the computation of "productivity value," it is recommended that these duties be shifted to the State Board of Equalization. Under this plan the State Board would have in its employ a staff of

trained soil surveyors who would make and keep a proper classification of all agricultural lands. It would also be the duty of the Board to obtain the necessary land use and economic data with which to compute the productivity value of each parcel of land.

The advantages of the proposed system are: (1) the land classification would be more accurate and uniform among counties; (2) the classification would be kept abreast of changes which might occur as a result of prolonged drought accompanied by overgrazing and soil blowing; (3) assessments would rest upon a scientific rather than a purely arbitrary basis as is now the case; (4) much of the personal element now affecting assessments would be removed; (5) county assessors would be relieved of a great deal of political pressure; and (6) lands would be assessed according to their ability to pay. Hence, a larger proportion of the land would probably be kept on the tax rolls and the burden spread more equitably over all the land.

Electric Rate-Schedule Ambiguities and Complexities

By H. H. MARTIN, JR.*

IN THE process of reviewing a large number of electric rate schedules for a recent study, one of the most striking facts disclosed was the wide prevalence of ambiguities and complexities in the schedules used. The latter were, for the greater part, those under which the customers of smaller private and municipal utilities in the United States are being billed for the services rendered.

It is not proposed, in the following comments, to consider the reasons for the conditions thus revealed but to call the attention of officials of these smaller enterprises to the fact that those defects, appearing as they did in hundreds of instances, indicate a condition which should be corrected in the interest of good business practice and satisfactory customer relations. It is hoped that the following necessarily limited and incomplete presentation of certain types of more common defects may result in an earnest and thorough effort to eradicate certain wide sources of misunderstanding.

Effective Date

A rate schedule is not complete if the date on which it first became effective is not definitely stated. With such omission it is obviously impossible to compute bills for a given date.

In some cases the information regarding the effective date, while not entirely missing, was vague or incomplete. Consider a rate schedule where the only clause pertaining to effective date was, "These rates were in effect November 1, 1934." Whether the schedule first came

into effect on that date or was in effect prior to that time is not clear.

Most effective date clauses were of the form "Effective July 1, 1934." This form was open to criticism as being indefinite since it was not clear whether the new rate applied to bills rendered on and after July 1, or to the energy consumed on and after July 1. With monthly billing periods this resulted in a difference of one month in the possible interpretations of effective date, and correspondingly greater differences for utilities having longer billing periods.

Another pertinent consideration was one relating to superseded schedules. A new rate schedule, becoming effective on a certain date, usually supersedes a similar schedule which was in effect prior to the effective date of the new schedule. In such event it is important that information clearly identifying the superseded schedule be incorporated in the new schedule. In numerous instances it was found that there were a number of schedules for a similar class of service, with different effective dates but with no indication that certain of the schedules had been superseded by others as was later ascertained.

Availability

In many instances the availability clause was either omitted altogether, or definite information was not furnished as to all cities, towns, or communities served. In other cases it was so framed as to be difficult to interpret, or contained duplications in schedule designations. A few examples are given:

own and are not to be taken as official expressions of the Federal Power Commission.

* Rate Engineer, Federal Power Commission.

Note: Any opinions expressed herein are the author's

One large utility serving a great many cities, towns, and communities spread over a wide area is rendering the same service under 17 different rate schedules. The schedules are identified alphabetically, but no information is given as to the names of the places in which each of these schedules is available.

Another utility's schedules include availability clauses, but lists certain towns that are not served under any of the submitted schedules.

A residential schedule from a third utility contains an availability clause which states—"Available in Cranston District." Since there was no geographic section by that name, there was no way of ascertaining just what towns served by the utility were included in that area.

Another example is that of one utility whose operations cover a wide territory comprising many districts which submitted several similar schedules bearing the same identification symbol. The utility's index shows that a rate "A" is available in the "Hampton District." But in looking for rate "A" in the utility's rate book three rates designated as "A" were found, each listed for the same service. Which schedule "A" was to be used for "Hampton District"?

Applicability

It is frequently difficult, if not impossible, to determine with accuracy the type of load or service to which a given schedule applies. Some schedules entirely lack applicability clauses and in others the applicability is either loosely defined or subject to conflicting interpretations.

As an illustration, consider an applicability clause reading: "This schedule is applicable to all residential service. Motors not exceeding two horsepower may be included in this service." Here the ambiguity lies in the limitation of the

allowable motor load. The clause might be interpreted to mean either that the permissible aggregate motor load is not to exceed two horsepower or that any number of motors may be served on this schedule provided that no single motor exceeds two horsepower in rated capacity. When it is realized that the method of interpretation will distinctly affect the bill of the customer using several small general utility motors, the importance of a clear and unequivocal applicability clause becomes self-evident.

There are many cases of utilities having two rate schedules neither of which contains data regarding applicability other than might be inferred from the titles which read, respectively, "General lighting" and "General power." Now assume that the residential customer who uses energy for lighting only wishes to add a refrigerator to his electrical equipment. He will naturally be interested in knowing whether the energy he might use for refrigeration would be billed on the power rate, which is considerably lower than the lighting rate. Nothing in the rate schedule will answer his question, and there is but little uniformity in the actual application of such rate schedules by the various utilities. One utility may allow household refrigeration to be metered separately on the power rate, while another may require that it be billed together with lighting on the lighting rate, and these features are frequently not made clear in the schedule.

Similar to the above examples are certain heating and cooking schedules which may or may not allow refrigeration. A number of utilities submitted "Heating and Cooking" schedules containing no reference to applicability except that which may be inferred from the title. It was found, through subsequent correspondence, that in some cases refrigeration also was allowed on these

schedules although nothing in the schedule indicates this fact.

The term "Combination Rate," while not always used to mean the same thing, usually refers to schedules applicable to a combination of two or more types of service. As applied to residential customers, these schedules ordinarily require that the customer have in use, in addition to lighting, some major appliance such as a refrigerator, range, etc. The minimum charge is usually higher than on the regular lighting schedules. In this group, too, numerous instances were found in which applicability clauses are lacking. The difficulty in such cases is to determine whether the schedules are available to those customers who used lighting only but who would be willing to pay the higher minimum charge in order to obtain the lower rate per kilowatt-hour which combination schedules usually offer.

The preceding comments might be augmented by reference to the difficulty experienced in determining the amount of incidental lighting, if any, permitted under general power rates. When the schedules do not contain applicability clauses, the utility's practice cannot be determined. In other cases, where the schedule includes such a clause stating that it is applicable to loads of some specified amount, such as five kilowatts or more, the question arises as to whether or not the schedule could be applied to lesser loads by paying the charges for a five-kilowatt load. Experience gained in the processes of reviewing and interpreting hundreds of schedules shows that no uniform policy on this point has been adopted by the majority of utilities.

Rate Form

The greatest ambiguity in rate forms appeared when it became necessary to determine whether a rate is of the step

or block type—that is, is the charge made at one rate if the total was less than a stated quantity per month, at another and lower rate if the use was more than the first stated quantity and less than a second stated quantity and so on, or is each rate per kilowatt-hour applicable to a given number or block of kilowatt-hours?

A simple example of such an ambiguous rate form is shown in a rate worded as follows:

"10¢ per kwh..... 25 or less kwhs. per month
8¢ per kwh..... 26- 50 kwhs. per month
6¢ per kwh..... 51-100 kwhs. per month
4¢ per kwh..... 101-200 kwhs. per month
2¢ per kwh..... Over 200 kwhs. per month."

Assuming a customer with a monthly consumption of 75 kwhs. and interpreting the above rate as of the step type, the bill will be 75 kwhs. at 6¢ per kilowatt-hour or \$4.50. For the same consumption and interpreting the rate as of the block type, the resulting bill will be 25 kwhs. at 10¢, 25 kwhs. at 8¢, and 25 kwhs. at 6¢, or a monthly bill of \$6.00, a difference of \$1.50. For increasingly larger consumptions up to a maximum of 200 kwhs. this difference will become greater and greater under the above rate schedule and beyond this point will gradually approach but never reach the charge per unit in the last step of the "step rate."

Billing Demands

To preserve uniformity in the presentation of the rates of the utilities used in the study, it became necessary to make a large number of standard billing demand assumptions. With these demand assumptions established, it was not a difficult task to ascertain the correct method of applying a schedule for billing purposes provided the billing demand clause was clearly worded. In some cases this clause was absent, and in others, ambiguous, making it neces-

sary to obtain more complete information or an explanation of the proper interpretation of the demand.

Further ambiguities appeared in the interpolation of the billing demands for various classes of service. As an example, take the computation of the net bill for a consumption of 150 kwhs. per month and a billing demand of 1.5 kws. under the following power rates:

Capacity charge:

\$1.50 net per month per kw. or fraction thereof

Energy Charge:

First 30 kwhs. per kw. of demand at 5.5¢ net

Excess kwhs. at 3.0¢ net

From the wording of the capacity charge for a 1.5 kw. demand the total net bill may be calculated as follows:

Capacity Charge:

2 kw. \times \$1.50 per kw. \$3.00

Energy Charge:

1.5 kw. \times 30 kwhs. use or 45 kwhs. at 5.5¢. 2.48

105 kwhs. at 3.0¢. 3.15

150 kwhs.—Total Bill. \$8.63

In the above computation 1.5 kws. is billed as 2 kws. in accordance with the rate per kilowatt or fraction thereof. However, the rate for the first block of kilowatt-hours, under energy charge, states 30 kwhs. per kilowatt, leaving the interpretation of the billing demand questionable; that is, for a 1.5 kw. billing demand shall the multiplier be 1.5 or 2.0 to obtain the number of kilowatt-hours to be charged for at 5.5¢? If the latter is used as the multiplier, the net bill will be \$9.00 or 37¢ greater than in the calculation above. This ambiguity called for a special check by the utility concerned.

Another common difficulty was that experienced in the interpretation of the policy in billing intermediate loads under such a schedule as the following:

HP.	Kwhs. at 8¢	Kwhs. at 4¢	Kwhs. at 2¢
2	45	90	Excess
3	60	120	Excess
5	80	160	Excess
10	100	200	Excess
15	125	250	Excess
20	150	300	Excess
Etc.	Etc.	Etc.	Etc.

The computation of the net monthly bill for a connected load of 6 kws. (8 hp.) and a monthly consumption of 750 kwhs. may serve as an illustration. Since 8 hp. is not included in the table, it at once becomes a question of what horsepower rating to use—whether to take the number of kilowatt-hours given for 5 or 10 hp., or to interpolate for the correct number of kilowatt-hours for 8 hp.

Still another problem was encountered in the conversion of horsepower into kilowatts. Some utilities in their power schedules specify power charges in horsepower-hours without giving the equivalent kilowatt-hour charges or the conversion factor they use.

Another case of ambiguity appeared in the computation of commercial and industrial power bills under schedules containing rates quoted in terms of kilovolt-amperes (kva.). In such cases it was first necessary to convert the kilowatts of demand to kilovolt-amperes of demand. As the billing demand in kilowatts was based upon a power factor of 85% lagging, all conversions were made at this rating. When the resulting kilovolt-amperes of demand contained fractions it became a question of correct interpretation of the utility's policy in the use of these fractions. Did the utility apply the fraction or take the next higher or lower whole number thereof? On the choice of methods resulted the possibility of three different monthly bills. The computation of the monthly bill for a demand of 150 kws. at a power factor of 85% and a consumption of 60,000 kwhs. under the following net rate will serve as an example:

\$1.25 per kva. of demand for the first 100 kva. of demand per month

1.00 per kva. of demand for all excess kva. of demand per month

and

- 4.0¢ per kwh. for the first 50 kwhs. per kva. of demand per month
- 1.5¢ per kwh. for the next 100 kwhs. per kva. of demand per month
- 0.9¢ per kwh. for all additional kilowatt-hours per month

One hundred fifty kilowatts of demand converted to kilovolt-amperes at 176.5 kva. (applying the fraction), 176 kva. or 177 kva. For 176.5 kva. the net bill is:

Demand Charge:

100 kva. × \$1.25.....	\$125.00
76.5 kva. × \$1.00.....	76.50
176.5 kva.....	\$201.50

Energy Charge:

176.5 × 50 or 8,825 kwhs. × 4¢....	\$353.00
176.5 × 100 or 17,650 kwhs. × 1.5¢..	264.75
33,525 kwhs. × .9¢..	301.73
60,000 kwhs.....	\$919.48

Total Net Bill..... \$1,120.98

Following the above method of computation the total net bill for demands of 176 and 177 kva. is \$1,119.40 and \$1,112.55 respectively, indicating that incorrect interpretation of policy in the application of the billing demand may result in an error amounting to \$3.15 per month.

Meter Rental

In most cases the utility supplies meters to residential customers without extra charge, relying on the regular charges in the rate schedule to cover investment in such equipment. A small number of utilities, however, require the customer to pay either a fixed monthly meter rental in addition to the regular charge or to supply the metering equipment. Some of these utilities make no reference to this fact in their published schedules; consequently their schedules do not enable computations to be made covering complete cost to the customer for specified amounts of energy. Meter rental is an essential part of the cost of service to the residential customer and where it is charged separately such fact

should be clearly set forth in the rate schedule.

Discounts

Clauses covering discounts are frequently difficult or impossible to interpret. The printed schedules of a number of utilities contain no information as to whether the quoted rate is gross or net, even though in some instances mention of a prompt payment discount or delayed payment penalty is made in the "Rules and Regulations." However, unless specifically stated it is a question whether such discounts are general or applicable only to certain classes of service.

A more common and troublesome question is: Does the prompt payment discount apply to the minimum bill? Some utilities allow a discount on the minimum monthly charges while others do not permit such deductions, and the schedules frequently do not state whether they do or do not.

The following is another example open to questionable interpretation—"... for consumptions over 50 kilowatt-hours—10 per cent discount." For a monthly consumption of, say, 70 kwhs., this may be construed as a 10% discount allowable either on the entire bill for 70 kwhs. or upon only the number of kilowatt-hours billed in excess of 50 kwhs. The former assumption will result in a step rate, the latter in a block rate.

Application of discounts often involves considerable uncertainty in the computation of power bills. Some schedules call for demand charges net and energy charges on a gross basis, stipulating a prompt payment discount for bills paid within a specified period from date of rendition. It is frequently impossible from the wording of some rate schedules to determine whether the discount is applicable to the entire bill or to only the energy charge. It has been

found that many utilities compute their bills in the first manner, while others use the second method.

An ambiguous situation developed when a discount clause, worded as follows, was encountered, "... 50 per cent refund on demand charges at the end of the year for those customers taking 12 months service and keeping 'off-peak' during the months of November, December, and January." This may be interpreted as 50% refund on the total demand for 12 months, or 50% of the demand charge for the three months mentioned.

Another example of a frequent difficulty is demonstrated in the computation of a bill for a demand of 12 kws. and a monthly consumption of 750 kw-hs. under the following schedule containing step discounts:

Rate:

4¢ per kw-h. first 100 kw-hs. per kw. of demand and
1¢ per kw-h. all additional kw-hs. per month.

Discounts:

1- 20 hp. of demand—None
21-100 hp. of demand—12½%
101-250 hp. of demand—25%
251-500 hp. of demand—35%
Over 500 hp. of demand—40%

Seven hundred fifty kilowatt-hours fall within the first block, which is 1,200 kw-hs. (100×12), so the gross bill is 750 kw-hs. at 4¢ or \$30.00 for the assumptions made. Since 12 kws. (16 hp.) fall in the 1-20 hp. block, \$30.00 is also the net bill as, according to the schedule, no discount is applicable to a consumption of 750 kw-hs. for a demand of 12 kws. However, the utility in this case corrected the \$30.00 bill as above computed to \$26.25, indicating a discount of 12½%.

An illustration of an ambiguous quantity discount is contained in the following extract from a standard rate schedule for general power service:

Rate:

"8.4¢ per kw.-hr. for the first 30 hours' use of the maximum demand per month

6.5¢ per kw.-hr. for the next 30 hours' use of the maximum demand per month

4.0¢ per kw.-hr. for all additional kw.-hrs. per month.

Prompt Payment Discount:

If the customer's bill for any month be paid at the company's office, on or before the tenth day of the next following month, it shall be entitled to a discount of ten (10) per cent from that portion of the bill for which the primary charge of eight and four tenths (8.4) cents per kw.-hr. is made. No discount shall be allowed on any such bill paid after such tenth day of the month whether the customer has actually received his bill or not.

Quantity Discount:

The customer shall be allowed a quantity discount, the percentage of which shall be computed as follows:

From the gross bill after deducting therefrom ten per cent (10%) of such portion thereof for which the primary charge of eight and four tenths (8.4) cents is made, there shall be deducted twenty-five (\$25.00) dollars, the remainder shall be divided by one and three tenths (1.3) and the quotient shall be the per cent of the quantity discount that shall be allowed, and this per cent of the bill shall be deducted therefrom, but in no event shall such quantity discount be greater than fifty (50) per cent."

Under the foregoing schedule, the question arises: Should the quantity discount be applied to the entire bill after application of the 10% prompt payment discount or to the amount remaining after the prompt payment discount and \$25.00 have been deducted from the original bill?

The computation of the net bill for a billing demand of 12 kws. and monthly consumption of 1,500 kw-hs. is as follows:

Energy Charge:

30 hours use of 12 kws. =	360 kw-hs.
360 kw-hs. at 8.4¢ =	\$30.24
360 kw-hs. at 6.5¢ =	23.40
780 kw-hs. at 4.0¢ =	31.20
1,500 kw-hs.	\$84.84

Discounts:

Prompt Payment

10% of \$30.24

(Energy at 8.4¢) or 3.02
\$81.82

Quantity	
Applicable to \$81.82—\$25.00 or	
\$56.82	
56.82	
Per cent discount	or 43.7%
1.3	
Amount discount 43.7% of \$81.82	
or.....	35.76
Total Net Bill.....	\$46.06

Applying the quantity discount to the amount remaining after prompt payment discount and a deduction of \$25.00, the total net bill becomes \$56.99, resulting in a difference of \$10.93 in the monthly charge to the customer.

Fuel Clause

The fuel clause adjustment is generally applicable to large commercial and industrial (primary) power service schedules and contractual rate schedules, but is applied by some utilities to all classes of service. In many cases the fuel clause does not appear in the rate schedule but only in the utility's rules and regulations. In such cases it is frequently impossible to ascertain its correct applicability. Does it apply to only high-tension service or to low-tension service as well, to all classes of business or only to large power business?

A more difficult interpretation is involved in the method of computing the adjustment to a given or specified condition. The following abstract from a standard fuel clause shows the difficulty encountered in computing the adjustment based on the cost of coal as supplied by the company:

"The energy charge shall be increased or decreased \$0.0003 per kilowatt-hour for each one cent increase above, or decrease below, twenty cents per million B.t.u. in cost of coal delivered in the company's bunkers."

For a cost of 15.85¢ per million B.t.u. for coal the adjustment per kilowatt-hour could result in three different amounts, it being a question as to whether a fraction or a whole number should be used as a multiplier. If the

company applied the fraction in computing the amount of adjustment, the multiplier would be 20 less 15.85, or $4.15 \times \$0.0003$, resulting in an adjustment of \$0.001245 per kilowatt-hour to be deducted from the customer's energy charge. If a whole number were applied, the adjustment could be either 4 or $5 \times \$0.0003$ per kilowatt-hour, respectively. Applying these adjustments in the order given to a bill for a monthly consumption of 15,000 kw-hs., the total deduction to be made for fuel adjustment would be \$18.68, \$18.00, or \$22.50, respectively.

Similar difficulties present themselves in the computation of the proper adjustment to be made under the following which are abstracts from the fuel clauses of two other utilities showing the range of variation in the wording used:

"For each 1¢ departure from the lower, or upper normal limits of 12¢ and 14¢, respectively, per one million B.t.u. heat content of fuel, a decrease, or increase, respectively, in rate per kilowatt-hour of \$0.0002."

"The price per kilowatt-hour shall be subject each month to an addition, or deduction of \$0.0004 per kilowatt-hour according to each 5 per cent of increase, or decrease in the cost of coal, per long ton on a base price of \$4.00 per long ton."

In addition to the aforementioned samples, numerous unusual fuel clauses were found. One of the most extreme cases encountered is that of one utility whose power schedules contain different fuel adjustments for each block of energy. The rate and fuel adjustments contained in this utility's schedule are as follows:

Rate:

For the first hour's (or fraction thereof) average daily use of the maximum demand. .7¢ per kw.-hr.
 For the second hour's (or fraction thereof) average daily use of the maximum demand. .5¢ per kw.-hr.
 For all additional hour's daily use of the maximum demand. 3¢ per kw.-hr.
 (No maximum demand to be figured at less than 1½ kilowatts.)

Fuel Clause

The price for each kilowatt-hour of electric energy supplied under this agreement, at the 7 cent rate, shall be subject each month to an addition or a deduction of \$0.0005 (5/100 of a cent) per kilowatt-hour according to each ten per cent (10%) of increase or decrease from and as compared with the base price for bituminous coal, of \$5.00 per long ton. All additional kilowatt-hours shall be subject to an addition or deduction of \$0.0004 (4/100 of a cent) for each five per cent (5%) like variation in the cost of coal, from and as compared with a base price of \$4.00 per long ton."

Application of Discounts and Adjustments

A correctly designed rate schedule, in addition to stating clearly how each discount or adjustment is computed, will state the manner and sequence in which they are to be applied. This is particularly true if some of these adjustments are expressed as percentages of the gross bill or any part thereof, and others are given in cents per kilowatt or per kilowatt-hour.

For example, assume a gross bill of \$8,000 covering a consumption of 400,000 kw-hs. and that this is subject to a 10% quantity discount, a 5% term discount, a 5% prompt payment discount, and to a credit of \$0.002 per kilowatt-hour through operation of the fuel clause.

Some utilities combine the percentage discounts and apply them first, as:

Gross bill.....	\$8,000.00
Less 20% discount.....	1,600.00
Net before fuel adjustment.....	\$6,400.00
Less fuel adjustment 400,000 kw.-hrs. at \$0.002.....	800.00
Net bill.....	\$5,600.00

Others apply each of the percentage discounts individually, as:

Gross bill.....	\$8,000.00
Less 10% quantity discount.....	800.00
After quantity discount.....	\$7,200.00
Less 5% term discount.....	360.00

After term discount.....	\$6,840.00
Less 5% prompt payment discount....	342.00
After prompt payment discount.....	\$6,498.00
Less fuel adjustment, 400,000 kw.-hrs. at \$0.002.....	800.00
Net bill.....	\$5,698.00

Still others apply the fuel adjustment first, as:

Gross bill.....	\$8,000.00
Less fuel adjustment, 400,000 kw.-hrs. at \$0.002.....	800.00
After fuel adjustment.....	\$7,200.00
Less 10% quantity discount.....	720.00
After quantity discount.....	\$6,480.00
Less 5% term discount.....	324.00
After term discount.....	\$6,156.00
Less 5% prompt payment discount....	307.80
Net bill.....	\$5,848.20

Each of these methods of applying a few of the usual discounts and adjustments results in a different net bill, and the whole illustrates the importance of clearly stating the manner and sequence in which all adjustments are to be made.

Conclusion

The above examples are only a few of the more striking instances among the great number of ambiguities and complexities scattered through the hundreds of schedules reviewed. Numerous others not cited would be ambiguous or complex to the average layman. The impression is that most of them were brought about through carelessness or insufficient experience in the technique of rate making, and the lack of national standards for rate schedule forms. It is hoped that this presentation will bring about a better realization of the need for such national standards; above all, it is hoped that it may eventually assist in bringing closer that day when the intelligent American purchaser of electric energy may be able to compute his bills, not only with a minimum of labor, but with reasonable assurance of having interpreted the rate schedules of the seller with complete accuracy.

Vitalizing Court and Yard Provisions in Zoning Ordinances

By HERBERT S. SWAN and GEORGE W. TUTTLE*

PROBABLY few persons appreciate what a profound revolution has been brought about within a comparatively few years in the development of cities through zoning. Prior to zoning, some cities had, it is true, passed fairly satisfactory building codes, but in nearly every case these related solely to materials and methods of building construction. They were seldom concerned with requirements as to open space about dwellings and when they were, they were, practically without exception, utterly inadequate. Such effective regulations as were imposed on residential buildings were usually to be found in housing codes passed by the legislature, either for specified or for all cities of the state. Generally confined to multi-family dwellings, these regulations made no provision whatever for open space about one- and two-family dwellings, in which the great majority of the population usually resided.

That the need for comprehensive zoning is still inadequately appreciated by cities is evidenced by the fact that one ordinance out of every three concerns itself exclusively with use zones. In other words, 2/3 of our zoning ordinances pay absolutely no attention to either the height or bulk of buildings. Of the ordinances that control the volume of buildings and the open space about them, only a portion go into the subject in any adequate way. Many make no provision whatever for front yards. Others refrain from all direct limitations upon congestion. Still others

ignore all restriction upon the percentage of lot area that may be occupied by buildings. Another large group fails to limit the height of buildings adequately. Of the probably 1,400 municipalities which have adopted zoning in this country, perhaps not more than one in five has what may really be termed comprehensive zoning in the fullest sense of the term. In other words, the preponderant majority of zoned cities stand in need of radically revised zoning regulations, in order to secure such an all-round inclusive control over their development as their zoning enabling acts permit.

I. Natural Illumination

Ban on Dark Rooms. What is the social harvest of such lack of control? Dark rooms, land overcrowding, congestion of population, rear dwellings, blighted areas, and constant shifting of residence centers. So long as no minimum standards are legally established for dwellings, such standards as owners voluntarily seek to observe are continually infringed upon by unscrupulous persons.

This state of affairs has, in so far as new buildings are concerned, been completely altered by cities that have formulated zoning ordinances with satisfactory area regulations. In these, every room in which people sleep, work or congregate must now have windows equal to at least 1/8 of the floor surface opening upon either a street or a legal sized open space. Rooms without windows and rooms with windows looking out upon air-shafts, rooms physi-

* City Planners, New York City.

cally dark, are today a thing of the past; our cities are at least beginning to discover that sunlight, daylight, fresh air and ventilation, though among God's freest gifts, are also among the most priceless, as their possession in every room is absolutely imperative to physical and mental health.

Compromises have, of course, had to be made with existing conditions; many courts and yards are still too small. We still have a long way to go in learning and applying the laws of natural illumination to housing, but we are at last on our way and our progress has already been nothing short of phenomenal. The fact that bad housing is not only a personal misfortune to those who have to put up with it but a public disgrace that simply cannot be tolerated has finally dawned upon our more progressive cities.

In some instances the standards of open space set by the most progressive apartment-house developments are outstripping those established under even the most advanced zoning ordinances. Thus, an increasing number of apartments are being built only two rooms deep, every room facing either upon the street or the rear yard, neither inner nor outer courts being employed. Some of these developments, moreover, cover only 50% of the ground, as against the 60 to 70% allowed by local zoning regulations. The most gratifying feature about these undertakings is the owners' insistence that they are more profitable than the larger houses permitted under the law would have been.

That private individuals should, on their own initiative, as a means of earning larger returns on their capital investment, entirely forego using less desirable kinds of open areas as well as the maximum percentage of lot area permitted by law, is an evidence of the

uneconomic effect of land overcrowding.

The deliberate policy in formulating open-space requirements of zoning ordinances has usually been, not to impose radically higher standards than were already set by the best building in the community, but to crystallize these standards into a systematic code applicable to the several types of buildings intended for respective zones. In other words, the effect of the court, yard, and open-space requirements has not been so much to commit building in each respective zone to the exceptional, though probably best development of its type in the city, as to outlaw buildings of distinctly anti-social standards. Having taken this first important step, we shall, as experience accumulates and it becomes increasingly more evident not only to the city planner but to the builder that sunlight, daylight, air and ventilation have an appreciable market value, be in a position to take the next step forward and tighten up our regulations with a view to outlawing the less desirable types of buildings now being built.

It has everywhere been demonstrated that buildings cannot steal their light and air from neighboring properties without themselves falling victims to their own theft; in due time, adjacent buildings, built as high and covering as much ground as themselves, will darken their own windows. Increasing recognition of this fact is responsible for progressive improvement in the area regulations of zoning ordinances.

Inner Courts. The quantity of light admitted into an unobstructed inner court is determined, not by its shape, whether circular, triangular, trapezoidal or rectangular, but entirely by the area of opening to the sky. Wherever the area exposed to the sky is the same, the flux of direct daylight (and of sunlight,

too) into the court is identically the same. Yet, the intensity of illumination varies at different points within the several types of courts within very broad limits. This is true even where the several types of courts are of a like height. Should the height be increased, the intensity would vary within still broader limits.

The reason for this variation is found in the fact that certain shapes admit of a more effective utilization of light flux than do others. Some courts may at certain points on a given level receive an abundance of daylight and yet at other points on the same level obtain only a fraction of that amount. This is the case, for instance, with triangular courts which receive maximum light at the middle of each wall and a minimum at the corners. A circular court receives, on the other hand, at any particular level the very same quantity of direct light at every point around the whole circumference. A polygonal court makes only a little less satisfactory use of its direct illumination. Of rectangular courts, the square court makes, par excellence, the most effective use of its light. As a rectangular court departs from a square and assumes a more and more elongated shape, the intensity of illumination increases on the two end walls at the same time that it diminishes on the two side walls. The two end walls, it should be remembered, embrace a steadily diminishing proportion of the total lineal wall area as the oblong shape becomes more pronounced. A square court is, as a consequence, by far the more desirable court.

All too often the fact is ignored that the court with the smallest perimeter enclosing a given area receives the maximum average illumination on every point of its surface. Some zoning ordinances actually prohibit a builder from utiliz-

ing an inner court of the most desirable shape. Thus the Spokane ordinance compels the provision of a court with a length $1\frac{1}{2}$ times its width. A square court which would utilize the daylight flux more effectively is prohibited by positive requirements of the ordinance.

Increasing the height of a court involves a more intensive exploitation of a given flux of direct light. The quantity of daylight entering the top of the court remains constant but the depth of the court is doubled, or perhaps trebled, with the consequence that, though there is no diminution in value of the daylight at the top of the court, a very great decrease takes place in the illumination of the bottom portion.

The quantity of daylight entering a high court is, of course, exactly the same as that entering a low court of like area. The distribution of light on the walls is also the same at every point in the two courts for the full height of the low court. Since this is so, where does the daylight that illuminates the lower portion of the walls of the high court come from? The daylight illuminating the lower portion, just like that illuminating the upper portion of the walls, comes, of course, through the top of the court. But, the daylight illuminating the lower portion of the four walls, as well as of the bottom in the higher court, illuminates only the bottom of the lower court. In a square court, having a depth equal to its width, the superficial area of the four walls is four times that of the bottom. In a square court, having a depth equal to twice its width, the superficial area of the four walls is eight times that of the bottom. The daylight, which in the lower court serves but one horizontal unit of area, must in the higher court serve four vertical units in addition to the one horizontal unit of area. The degrees to which

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the light must be "thinned out," as it were, in order to serve this greatly increased area are indicated in the data below, which show the daylight illumination at different points in the two courts when the daylight value of the unobstructed half dome of the sky on a point upon a vertical wall is taken as 100 units and upon a horizontal surface as 200 units:

	Low Court	High Court
On end of each wall at bottom.	11.14	2.78
In middle of each wall at bottom.....	14.23	3.06
On bottom of each corner.....	27.69	17.80
On bottom at middle of side..	36.07	13.23
On bottom at center of bottom..	47.19	14.69
Average on bottom.....	36.75	14.73

From the above data it appears that the average direct daylight on the bottom of a square court is diminished almost $\frac{2}{3}$ by increasing its height from one to two times its width. Every unit of light sacrificed by the bottom goes to illuminate the increased wall surface of the higher court; the light sacrificed by the bottom is, indeed, the only direct light received by the additional wall surface in the higher court.

The area of an inner square court must be quadrupled each time its height is doubled in order to maintain the same standard of daylight illumination at its least illuminated point. But each time the area of the court is increased fourfold, its volume is increased eightfold. The result is that the area of the court facade divided by the volume within the court doubles each time the height of the building is doubled. This fact in itself explains the unsatisfactory light conditions almost universally prevalent in inner courts; their use constitutes, considering the typical lot unit in its relation to the average development,

such an extravagant use of land as to render an appropriate size practically prohibitive.

This disability of the inner court is inherent in its character. Being a self-contained court, it derives no light from neighboring open spaces. On the other hand, it contributes no light to the common fund of light in the community; such light as it receives it keeps entirely to itself. It not only "hogs" its own light, but such open space as it provides for its own illumination, in increasing the outside dimensions of the building, actually increases its obstructive effect upon other buildings. In contrast to the inner court, the front yard, side yard, rear yard and outer court all, to a greater or less degree, complement and supplement other open spaces. As a result, they purchase their light more cheaply than does the inner court. They are therefore better suited to provide the requisite light for buildings, especially high buildings. The recent zoning ordinance passed by Lyndhurst, New Jersey, frankly recognizes the defects of the inner court by prohibiting its use in all residence buildings.

Setbacks in Courts. A considerable number of cities have attempted, through zoning, to encourage use of setbacks as a remedy for the defects inherent in inner courts. Through a recession of the walls in the upper portion of the court it has been thought that a minimum standard of illumination might be maintained at the bottom of the court at the same time that an appreciable saving might be effected in the cubage of the court. Increased light can, of course, be obtained for the lower stories of a court through use of setbacks, provided the setbacks are made uniform on all four sides around the court. Where the setbacks are, however, not uniform on all four sides, or

omitted on one or more sides, the effect is immediately reflected in diminished illumination on the opposite side or sides of the court.

That a setback court is more economical of space than a vertical court in providing a required amount of light at the least illuminated point is wholly illusory, for the area of the ordinary inner court with vertical walls is quadrupled with each doubling of height, the ratio of height to width being constant. There is not only no deviation from this principle in the setback but, because most of the increased space resulting from the setbacks is so situated in a setback court that it is ineffective in augmenting the light at the least illuminated point, the setback court always requires a larger cubage than a vertical court in order to provide a required quantity of light at the bottom of each facade. The substantial amount of this increased volume is indicated by the fact that it varies usually from 25 to 33% of the space embraced in the vertical court. No matter what the setback ratio or the height of buildings, the setback court is always more extravagant of space than the ordinary vertical court with uniform dimensions from top to bottom. Considering the least favored point in the court, the vertical court is always the more economical; it invariably admits either the same amount of light with less volume or a greater amount of light with the same volume of open space. But this disability of the setback court is limited to that portion of its elevation within its first setback plane. Above that level, although a portion of the setback volume is still ineffective in admitting illumination to different portions of the court, the part of the setback volume that is ineffective diminishes with each successive setback above the ground until the

topmost setback is reached. There the entire court provides illumination for every point in that setback plane. Every portion of a setback court above the first setback receives therefore more illumination than the corresponding portions of a vertical court having the same ratio of height to width.

Unlike the setback court, the vertical court does not sacrifice the light of the lower floors where it is most needed to increase the bulk of the building near the ground. The vertical court makes, volume for volume, the best provision for the least illuminated point. As a rule, the court that does this is the preferable court since, if we take proper care of the least illuminated point, the other points will take care of themselves. Nor should the fact be overlooked that the character of the setback court is such that it tends to produce excessively deep rooms in the lower floors. To keep the volume of the court within bounds there is, moreover, the temptation to skimp on the setback ratio. One well known city has, for example, in its most liberal zone a setback ratio of 1 to 24 for its inner courts. Such a setback requirement constitutes, in plain language, a crime against proper illumination of buildings. Wherever used, the unfortunate aspect of setback courts is the emphasis laid upon the greatest possible economy of space rather than upon the most desirable illumination of buildings.

Minimum Window Areas. We know so little about the laws of natural illumination that we are unable to say what is a good court or a bad court, what is a proper or improper limitation of the height of buildings, or what is the comparative daylighting value of a window when facing upon different kinds of open spaces. The cause of good building, especially in the field of natural

illumination, has suffered irreparable loss by our general lack of knowledge in these matters. Such facts as we have on the subject have been so enwrapped with mathematical technicalities as to be practically valueless to layman, architect, and city planner. This is probably why today not a single zoning ordinance is based upon a scientific appreciation of the laws of natural illumination. Formulation of such an ordinance awaits the laying down of the ground work for a science of natural illumination so that we may, within the physical limitations of the subject itself, obtain as much control in utilizing sunshine, daylight and reflection to obtain predetermined results in the use of natural illumination as we now possess in the use of artificial illumination.

This means that we need data which will give us accurate information relative not only to the daylight flux entering enclosures (whether streets, inner courts, side yards and rear yards) but to the actual illumination at different points within these enclosures. It means more than this; we must also have data which will give us the daylight flux entering any window opening upon each of these spaces, whether situated at one level or another, down from the top of the enclosure, as well as the illumination obtained through a window at any point within a room.

A window should be considered, not as so many square feet of a building facade, but as a source of valuable natural illumination. Today, windows are quite generally distributed through buildings in an arbitrary manner without due consideration to their illuminating value, with the result that many rooms are almost physically dark from the moment they are built. Yet with proper treatment windows may within limits be utilized so as to afford a definite illumi-

nation at different points within rooms in the same manner as artificial sources of illumination. But to do this demands a more efficient use of glass than is now the case in buildings.

Let us consider windows as parts of a building free from obstructions. The daylight illumination admitted under such an instance depends upon the size of the several windows, whether the window area is all in one window or divided among several, and the thickness of the building wall in which the window or windows are set. Distribution of the illumination within the room depends in turn upon the spacing of the windows and the height of the top of the window. In built-up communities most windows are, of course, to a greater or less degree, obstructed by neighboring buildings; the windows face either a built-up street or look out upon some kind of an open space, a side or rear yard, an inner or outer court. In no instance can a window admit more light into a room than the flux incident upon that portion of the building facade occupied by it. This varies for each type and size of open space utilized by a particular window.

The position of a window within a room is also of considerable importance to illuminating value. A central location at one end of the room midway between the two side walls gives an entirely different result from a location at either corner of the room. Two windows at one corner of a room, though they admit the same daylight flux as either two windows spread or grouped within the same wall or as two windows in opposite walls of the room, nevertheless produce a very different distribution of illumination within the room.

Various zoning ordinances require a minimum window area proportioned to the floor area of rooms. An increasing

number of ordinances fix the window area at $\frac{1}{8}$ of the floor area. Although this requirement is a step in the right direction, it obviously, in light of the above discussion, is a very rough rule-of-thumb used to accomplish results which should be attained with considerably more precision. Window areas should, if used as sources of illumination, be based upon the daylight flux required to afford a minimum illumination in room interiors. Application of such a standard requires mastery of a technique in utilizing natural illumination which is today not generally available to either architects or planners.

II. Front-Yard Requirements

A zoning ordinance which effectively controls front yards and setbacks on all streets throughout a city is of inestimable value to the whole community. The advantage that such front yards established under the police power have over building lines under eminent domain lies in the fact that they are established without payment of damages on all streets throughout the entire city at one time, while those established under power of eminent domain are adopted separately for each street in an independent proceeding, which necessitates the appraisal of damages and benefits. Building lines established by eminent domain are usually laid down laboriously over a period of years, each as a separate line, frequently bearing little relationship to the line across the street or to the line in neighboring blocks, and never any relationship to the requirements of a comprehensive scheme of building-line control for different types of development or to the zoning and planning needs of the city as a whole. Usually most of the streets never have any building lines established upon them at all. Under such circumstances it is surprising

that there should still be cities which neglect to adopt this useful tool in the control of their building development.

When the first mandatory front-yard requirement was incorporated in a zoning ordinance in Newark, New Jersey, but 18 years ago, it was disguised as a provision for outer courts so that the courts would not recognize it as an ordinary building line. As the cause of zoning won its way in the courts, these provisions were elaborated into the comprehensive front-yard provisions characterizing present-day ordinances.

Most ordinances make the average depth of front yard observed by buildings at the time the ordinance is adopted the minimum front yard to be provided on each side of the street within the block. If this average front yard is unreasonably deep, because some or all of the buildings are exceptionally far back from the street, then the front yard need not be greater than a certain number of feet laid down in the ordinance. Front yards of more than 50 feet are seldom demanded. If either side of the street within the block is vacant, then a definite building line is fixed by the ordinance. This distance usually varies all the way from 15 to 50 feet.

In addition to such requirements, it is becoming increasingly more common to insist that buildings set back a minimum distance from the center of the street, even if compliance with this rule operates to force buildings farther back upon the lot than the average front yard in the block. The distance back from the center of the street is sometimes fixed at 30 feet, very frequently at 40 feet and, in many cases, even at 50 feet.

The "Travelling" Building Line. In formulating front-yard provisions for residence zones, care should be taken to avoid what has been termed the

"travelling line." Whatever the depth of the front yard, as defined by the ordinance, it should be a fixed depth, equally applicable to all buildings thereafter built on that side of the street within the block. The average front yard observed by buildings erected at the time of the passage of the ordinance assures this result. Some cities have thoughtlessly fixed the date for determining the setback line at the time of the proposed erection of the new building. Where buildings within the block at the time of the passage of the ordinance did not observe a common setback line, this has, of course, resulted in the requirement of a different front-yard depth for every new building.

The Saw-Tooth Building Line. Other cities have made the error of requiring larger front yards for high buildings than for lower buildings within the same zone. This mistake has been quite commonly committed in apartment-house zones. A homologated street front is never desirable as a permanent feature of a street facade. It may in some cases be impossible to avoid it in the transitional stages of widening a narrow street, through a gradual recession of building fronts, but this is something entirely different from proportioning the depth of front yard to the height of a building on the lot. Such a requirement is mischievous in perpetrating needless ugliness upon the community. It also robs buildings of their light and air.

Extending Control over Front Yards. Most ordinances insist upon compliance, in the case of corner lots, with the front-yard requirement on only one street. Usually a corner lot is considered as fronting upon the street with the narrower frontage; where the two frontages are of equal length, the owner has the privilege of electing the frontage to observe the front-yard requirement. A

lot that runs through the block from street to street must observe the front yard demanded on both streets.

These rules may in some instances work more harshly upon one lot than upon another, but an appeal in such cases may always be taken to the board of appeals. On the whole, experience supports the wisdom of these provisions. Indeed the tendency, instead of relaxing them, is to make them still more comprehensive.

Setback from Center of Street. Apartments, stores and factories, though usually entirely exempt from all front-yard requirements in earlier ordinances are now, in an increasing number of cities, being obliged to setback a minimum distance from the center of the street—in the case of corner lots very often from the center of both streets, although one- and two-family houses in these very same cities and in these very same zones need observe the front-yard requirement upon only their narrower street-front. Although apartment zones are usually subject to their own appropriate front-yard requirements, the setback in business and industrial zones is invariably in lieu of the front yard. How is this apparent discrimination against the multi-family house and the business building justified?

First of all, let it be explained that if the city is large, it usually has at least two or more business zones. The requirements are, of course, adjusted to the respective needs of different localities. For purposes of illustration, we shall take a suburban business zone.

Probably no one would dispute the fact that comparatively little traffic congestion results from one- and two-family dwellings, but when large, multi-family houses or stores are built the original narrow streets of a community become inadequate to care for the traffic

load they are called upon to bear. With the introduction of stores, the streets which formerly carried few vehicles are loaded beyond their capacity with both moving and parked cars so that traffic, in many instances, barely crawls. A 40- or 50-foot street is incapable of satisfactorily caring for the needs of even a suburban business community. This is known before it is so built-up; there is no need to build up the area with the maximum permitted height of buildings in order to ascertain the incapacity of the streets. Common sense therefore dictates that the condition, which will at a later date inevitably result, should be anticipated through present establishment of setback lines to be observed by these buildings.

Setbacks on Corner Lots in Business Zones. Much pathos may be wasted upon the cruelty of subjecting owners of corner lots in suburban business zones to a setback on the side street. Let us remember that adjoining residence land is seldom worth over \$50 to \$80 a front foot, while business property sells for from \$200 to \$1,000 a foot. Instead of limiting our thought to the land included within the setback restriction which the owner cannot use for business purposes, let us think of the huge increase in values the owner has enjoyed as a result of the business designation in the zoning plan. Had the community kept his property within the residence restriction, it would very probably be worth but a mere tithe of what it is, even subject to the setback line on the side street in the business zone.

The setback line is, moreover, designed to benefit his own property. It is intended to enable a business district to care for an increasing amount of trade. If no heed is paid to the time when the present plan is entirely swamped with the increasing traffic

load put on both sidewalks and roadways, the area will, unless expensive street widenings are carried out, very probably suffer an economic blight with a distinct falling off in both business and values.

Some cities have realized that to require all corner buildings, without exception, to setback a minimum distance from the center of the side street would, in some instances, result in absurd situations. They have sought to overcome this difficulty in several ways. First of all, they have protected narrow corner lots from an unreasonable application of the rule by providing that not more than 30% of the width of the lot shall be affected by the setback from the center of the side street. Then, to obviate increasingly deep setbacks on either relatively unimportant side streets in no need of prospective widening, or streets improved with such expensive structures as to make all widening impracticable, they have related the setback to the major thoroughfare plan. In cases where the setback lines secure a space between buildings on the other two sides of a street wider than that contemplated in the major thoroughfare plan, they provide that the setback need not exceed $\frac{1}{2}$ of that proposed width.

Street improvements in business districts are seldom of great benefit to property in one- and two-family dwelling districts. Property in such localities practically never goes up in value as a result of a street extension or widening in a neighboring business center, unless such property itself becomes available for business development. Yet property owners in the business centers of cities are everywhere exceedingly anxious to shift the cost of various improvements they wish effected in their own neighborhood to the shoulders of un-

benefited owners of small houses. Does not fairness demand that these owners be obliged to bear their own burdens? That is what the setback line in business zones purports to do.

Another aspect to this whole question relates to the position of property owners on the side street back of the corner lot. They are all obliged to observe the front-yard requirement of their residential zone. If the corner lot in the business zone at the end of the block need provide no setback, then these owners will have the view, light, and air received from the end of the block seriously diminished. Common fairness, it may be urged, demands that the corner lot be compelled to observe a reasonable setback on the side street. The situation of the butt lot in the residence zone immediately back of the corner lot is particularly deplorable in the absence of a setback on the side street.

So that the facts may not be misunderstood, let us recall again that no one forces the owner of a corner lot in a business zone to utilize it for business purposes; so long as he devotes it to a one- or two-family dwelling, he is exempt from the setback upon the side street. Until he himself determines that his corner lot with a narrow store is worth more to him than a one- or two-family dwelling, he need not observe the setback on the side street.

Need for Setbacks in Commercial Zones. Unless a city requires setback lines in its commercial zones, much of the potential value of the front yards so laboriously evolved over a long term of years in residence zones will be entirely wasted when these zones, because of increasing demands of trade and industry, are gradually changed into business zones.

Let us assume that all buildings on the two sides of a 40-foot street are, as

a result of the operation over a period of years of the front-yard provisions of its residence zone, 80 feet apart. Let us also assume that the zoning regulations in this particular city demand no setback lines in the commercial zones. Under such circumstances any change of zone from residence to business would have the effect of rescinding the setback line. Thereafter all new buildings would, of course, be allowed to project out to the street line.

To develop and maintain a uniform setback and then, at the crucial time, when there is the utmost need for maintaining a reasonable space between buildings because of an imminent street widening, made necessary as a result of a huge increase in traffic, rescind it, can scarcely commend itself as being either rational or foresighted. Setback lines in business and industrial zones need not be identical with those required in residence zones; there are sufficient differences in the two classes of zones to justify a considerable difference in their respective setbacks. But this is an entirely different consideration from requiring no setback at all in commercial zones. By demanding a minimum setback from the center of the street in such zones, a sufficient space can in due time be secured to guarantee a street of adequate width to serve the increased traffic of the prospective extension to the business zone in a permanently satisfactory manner. The land within the setback lines of the business zones, no less than the land within the front yards of the residence zones, would belong to the property owners until duly taken by the municipality. But being confronted with the fact that they could not build upon it, even if they kept it, would not the owners, in view of the great need for additional street space to make their property

more accessible for business, be willing in a considerable number of cases to cede these strips to the city? If they did not, the city could obviously procrastinate in changing the zones. This is an aspect of the subject relating to setback lines which will in the future undoubtedly be given increased attention.

III. Congestion of Population

Limitation upon Percentage of Lot Occupied. In restricting the bulk of buildings, a large number of cities have relied exclusively upon their height limits and upon their court and yard provisions. So long as a building conforms to these general requirements, it may occupy any proportion of the lot area the owner chooses to build upon. Indeed, the only limitation preventing buildings from covering the entire lot is the requirement in some cases as to yards—a side yard of a width varying between four and six feet on either side of the building and a rear yard back of the building. The result is that even in the best one-family detached house districts of these cities now used by buildings occupying 20 to 25% of the lot area, new buildings may cover from 50 to 70% of the land.

Are our best residence districts entitled to no more protection than is afforded by such regulations? The suburban character of a neighborhood, it is safe to assert, can never be maintained if buildings are to cover from $\frac{1}{2}$ to $\frac{3}{4}$ of the land. Requiring an open space of eight or twelve feet in width between buildings is not in itself sufficient to maintain the amenities of one- or two-family detached house districts. Additional space must be kept open, else the only distinction between tenement districts and home districts will be in the heights of buildings and the kind, not

the amount, of open space surrounding them. Far from being superfluous, the provision limiting the proportion of lot areas which buildings may occupy is one of the most useful in zoning ordinances. It affords additional light and air; it promotes family privacy; it encourages maintenance of lawns with grass and trees; it provides additional play spaces for children off of dangerous traffic streets; and it segregates homogeneous types of buildings.

A considerable number of zoning ordinances are fairly adequate in the proportion of open space demanded in one-family districts. Here 60 to 75% of the lot must ordinarily be left open. In the multi-family house zones, however, the open space required is usually reduced to 30 or 40% of the lot area; in the commercial and industrial zones, to only 10 or 15% of the lot area. Many even of our best zoning ordinances are altogether too liberal in their coverage provisions.

The reason is not far to seek. The chief difficulty lies in the fact that practically all architects, builders and real estate owners have a very inadequate understanding of natural illumination. Few persons, for instance, seem seriously to realize that, given a fixed height, the sunlight and daylight illumination incident upon the walls of buildings and the ground level between buildings, is a function of the unbuilt space left open to the sky. In other words, comparable buildings, possessing a given height and situated upon like lots, will have their walls and the ground about them illuminated, on the average, in proportion to the amount of space left open to the sky. Suppose we have two different types of development of a given height, one covering 80% and the other, 40% of the lot area. Since the latter development has three square feet of open space to every square foot of

open space in the former, obviously also thrice the daylight flux must enter through the open unobstructed top of its various courts and yards. Too large a roof area is often the cause of darkened windows in a building. Thousands of buildings, in the greed of their owner for space, hog a disproportionate part of the lot area and as a consequence so reduce the daylight flux entering their courts and yards as to render nearly all their floor space untenable because of its poor illumination. Buildings must have roofs, but we should not forget that the sunlight and daylight incident upon the roof will never enter a vertical window—no, not even a window on the top floor.

Provisions limiting the percentage of lot which buildings may occupy in the different zones should obviously be incorporated into all zoning ordinances. Such provisions are accompanied by so many benefits to a community, direct and indirect, that one cannot but be surprised that many cities have been so indifferent to their own well-being as to default in so necessary a control over buildings.

Prohibition on Rear Buildings. In the old days, as land rose in value, everybody thought it quite the thrifty thing to build a new house on the back of his lot; if the lot was sufficiently deep, two or three rear houses, one in back of another, were put up in the back yard. Examples might even be cited where houses are five or six deep on a lot. Such disgusting development is strictly forbidden by every really up-to-date zoning ordinance. No back yard is today deemed sufficiently good to be somebody's front yard; every house is considered important enough to merit its own street frontage. We hear very little of the thousands of rear dwellings that zoning has prevented; their prevention

is nevertheless an important contribution to the public morals and health of cities.

Location of Accessory Buildings. In years gone by, owners have in most cities been free to erect accessory buildings on any part of the plot. If they elected to construct garages, stables, wood sheds or hen coops on the front of the lot and a dwelling on the rear of the lot, that was their privilege, irrespective of the injury that such a building would certainly inflict upon their own or adjoining property.

The self-interest of property owners has, of course, as a rule, impelled them to construct accessory buildings upon the rear of the lot. But there have been many exceptions to the rule. Whenever the shape or size of the plot is the least bit exceptional or where the elevation of the ground is uneven, owners are prone to construct their accessory building in a manner which, if it does not actually ruin adjoining property, at least seriously impairs its marketability.

Too many owners are still blind to the fact that they cannot make what, in effect, amounts to a rear entrance of their neighbor's front yard without also injuring their own property. No butt lot can be improved with a building comporting with the general character of the district if its entire side line is flanked with miscellaneous accessory buildings.

The fact that accessory buildings are usually of a more hazardous character, that combustible material is frequently stored in them, that they are commonly used for purposes which result in either the emission of ill-smelling odors or an undue amount of noise make it appropriate to control their location upon the lot. Houses with living rooms having windows opening out over garages are

practically untenable when engines are being tested. Escaping gas vapors pouring into living rooms not only pollute the atmosphere, but are positively dangerous to life.

Such evils are to an increasing extent being remedied by regulating location of the accessory building upon the lot. As a rule, no accessory building may be erected upon the front half of an interior lot. On exceptionally deep lots, this rule is, however, not applied so as to keep accessory buildings more than a reasonable distance, say 70 feet, back from the street. No accessory building may be located within five or ten feet of its rear line when such line forms part of the front half of another lot's side line. This provision is of particular importance to the butt lot, the lot adjacent to, and to the rear of the corner lot on the side street. A common rule in the case of corner lots fronting upon two streets is to require accessory buildings to be located upon the interior quarter of the lot, removed from all streets. In the case of interior lots fronting upon two streets, the accessory buildings must be kept off that quarter of the lot nearest either street. Regulations like these cover every conceivable situation resulting from a misplaced accessory. But the regulations are entirely waived where the accessory is incorporated as an integral part of and is enclosed by the same walls as the building to which it is accessory. In that case, the accessory may be built anywhere upon the lot.

Cities which have adopted such regulations as these have taken a big step in preserving the amenities of their respective districts. Hen coops, cow stables, garages and wood sheds located upon the front of a lot are often as disastrous to the residential character of a street as a store or a factory.

Complete absence in the past of regu-

lations controlling location of accessory buildings upon the lot has resulted in many owners exercising comparatively little or no foresight in developing their plots. Accessory garages on the front of the lot, with roofs projecting several feet above the porch level of the house in back of them, garages crowding the rear lot line up against residences or apartments on the adjoining butt lot, accessory buildings too near the principal building or jammed in tight between the principal building and the lot line so as to cut off the through ventilation between the rear yard and the street, and accessory buildings occupying a disproportionate amount of the lot area—all these abuses demonstrate the need of doing something to keep the accessory building within proper bounds.

Limitation upon Congestion of Population. Fortunately for most cities, outside of our large metropolitan centers, builders have not vied with each other to see who could pack the most people upon a lot. But the proper time to prevent undue congestion is, of course, before it becomes either too intense or more widespread. Many cities have failed to recognize this important fact in their zoning ordinances. As a result, their apartment zones are open to an unlimited overcrowding of land.

The fact that a large part of a city's population resides either in private homes or small multi-family houses always constitutes one of its chief social advantages. People residing in small houses not only take a keener interest in civic affairs but are more contented and efficient. A sparse population, moreover, makes for more normal living conditions. Every family residing in a small home is equipped with more light, air and ventilation than one residing in a large tenement. One cannot raise healthy human beings without sunshine

and pure air any more than one can healthy and vigorous plants.

As a matter of mere construction, large multi-family houses can, of course, be built and equipped with adequate open space for light and air. A multi-family house can be just as healthful as a one-family house, but the fact remains that economic factors encouraging construction of multi-family houses operate in such a manner that multi-family houses invariably are equipped with less open space and ventilation than are smaller residences.

The overdevelopment of a small percentage of a city's area may result in the enrichment of a few sporadic owners through their capitalization of congestion. But, because a building houses 50 families, it does not follow that there are enough builders to buy all the vacant plots in the neighborhood who will erect 50-family houses on them. The contrary is more likely to be true. The fact that a 50-family house has been built where only a two-family house should have been erected has the effect of leaving 24 other lots vacant when they might otherwise have been improved, and of holding in abeyance the effective demand for them until increased population again warrants erection of a large multi-family house.

Objection has been raised to limiting the number of families on an area basis, on the score that reducing the density of population will require subdivision and improvement of a larger superficial land area. The less densely people are housed, the greater will be the actual length of the streets and the extent of public utilities required to serve them. But it is not to be expected that the cost of land per family will increase in the same proportion as the diminution in number of families to the acre. The economies obtainable through narrower

streets and lighter pavements, possible with a sparser population, go a long way to offset the greater length of roadways, sewers, etc., necessary to develop land. The aggregate increment in values throughout a city will, moreover, probably not be lessened by limiting in a reasonable manner the number of families that may be housed on a given unit of land. On the contrary, it will rather be increased, given a broader base and made more stable. Who would deny that, viewed in every way, it is more desirable that this increment should be shared by a larger number of owners than by a mere handful?

The relatively small amount of open space per family provided in extreme cases of land overcrowding has not received the consideration in the past that it deserves. Just compare the vacant ground per family in a six-story walk-up, housing 30 families and occupying 70% of the lot, with that in a one-family house occupying but 25% of the lot, both on lots 50 x 100 feet. In the latter there are 3,750 square feet of vacant space per family; in the former only 50. In other words, the family living in the private house has 7,500% more open space per family and, as a consequence that much more sunlight and daylight, on the average, than each of the 30 families residing in the tenement. Facts like these are in themselves sufficient to explain why children in one-family house zones play on the lot while those in multi-family house zones play in streets.

It is a strange phenomenon that despite a half century fight against bad housing conditions, congestion of population should proceed at an accelerated rate in many cities. More improved and enlightened housing legislation may have effected higher sanitary standards in the environment surrounding the home

but it has not checked the ever-increasing concentration of population. Indeed, to a degree, it has even seemed that this overcrowding of land was caused by the very measures designed to improve conditions.

Year after year, new bridges, new tunnels, new transit lines, new highways have only extended the congested area. They have not dispersed population, but rather helped, each in its turn, to create new congested centers in the purlieu of great cities.

How to control congestion is as important and difficult a problem as any that confronts cities today. Height regulations afford no satisfactory solution of the question, for even though height limits be as low as it is practicable to impose, the fact remains that a large number of families can be housed in low buildings. Nor will area regulations get to the bottom of the matter, for court and yard requirements will admit of the construction of a 50-family house as readily as of a three-family house. To prevent undue congestion of population it is necessary to go beyond the imposition of height and area regulations. Experience shows that in the absence of restriction on congestion there is practically no limit upon the population that can and *will* be housed on a unit of ground. In many cities the new tenements erected under zoning accommodate a larger number of persons on a given land area than the old slum houses in the most congested part of the community.

The problem of limiting congestion is generally very much more than one of preserving detached house districts. The one-family row house and the multi-family house harm the private detached house, but the same can be said of the big tenement alongside the two- or three-family house. The establishment

of one-family or of two-family house districts, though it limits land-overcrowding in these districts, does not restrict it in those parts of the city left open to apartments. There the owners are still allowed to pile up as many families as they choose.

In the opinion of a large number of persons, the English Town Planning Act of 1909 pointed out the correct method by limiting the number of families that might be housed to the acre. The first city in this country to introduce this method of direct limitation upon congestion was Newark, New Jersey, in 1919, under the direction of one of the authors. Now, literally hundreds of municipalities limit their maximum congestion on this basis. Some cities have preferred to express the limitation in terms of a minimum number of square feet of lot area for each family housed, instead of so many families per acre. Whether the limitation be expressed one way or the other makes no difference, one is the reciprocal of the other. The main consideration is not the method but the limitation. But really to safeguard a community against bad housing conditions and congestion in the future, a direct restriction should be placed upon the maximum number of families that may be housed on a unit of land area in all zones whether residential, business or industrial.

Garden Apartments. Many suburban communities are awakening to the fact that there is no need for the limited number of apartments they require to be built like the high, congested tenements in the heart of the city. Multi-family houses, if built on large plots, may be constructed in a manner to afford all advantages of central heating, elevators, janitor services, etc., at the same time that they are equipped with such suburban amenities as porches, sun

parlors, spacious lawns, attractive gardens, playgrounds for children, and a parking area for the machines of tenants.

Built thus, an apartment ceases to be a parasitic building, obtaining a disproportionate amount of its light and air over neighboring property, congesting the streets with parked cars, and pouring its child and dog population onto the sidewalk for play. Not only does it bear its own burdens as a building in the community, it may even provide an enviable standard of life to a considerable group with ideals identical to those of the one-family residents in the community but who, because either of age or economic limitations, are unable to maintain a home of their own. It is a common cause of complaint in the high grade residence suburbs which absolutely prohibit apartments that their young men and women as they marry must, because of the absence of apartments and their inability to maintain a one-family house, leave their native community to make their homes away from friends and relatives in the crowded apartments of the city. Similarly, older members of the community who, having reared their families, wish to give up their housekeeping responsibilities, can only do so by removing from the community. The result is that such a suburb is rapidly falling a victim to the regulations it has erected for its protection; the very citizens who have fixed its social ideals during the past generation and who will carry on these ideals during the next generation are being gradually exiled from the community and replaced by strangers.

Multi-family houses in these suburbs would, if balanced in number and kind to this need, afford an opportunity to members of the younger generation, while they were increasing their earning power, to occupy an apartment and then,

when they could better afford it, move into a home vacated by a family of the older generation, retiring to take up their residence in an apartment. A limited number of apartments would, if this idea worked out, be a means, not of destroying but of preserving the social stability of a suburban community.

The picture is no doubt one to conjure with, especially when a suburban owner wishes his property placed in an apartment-house zone. But whether the apartment, when once built were or were not occupied by a local suburbanite, the superiority of the garden apartment over the typical city apartment cannot be questioned. Thus the usual apartment in the city may occupy the entire width of the lot. A garden apartment must, on the other hand, in a town like Montclair, be equipped with two side yards and each side yard must ordinarily have a width equal to $\frac{1}{2}$ the height of the building. A space equal to the height of the building would, in other words, have to intervene between two neighboring apartments of like height. This allows a 45-degree angle of light to the ground apartments. An inner court must have a minimum width at its lowest level equal to the height of the bordering wall above the top of the window sill of the lowest floor facing upon the court. For a four-story building this would ordinarily mean a minimum width of 50 feet for an inner court; for a six-story building, a width of 75 feet. Inner courts, in other words, have to be made so wide that they are rarely used; but if used, they will, because of their adequate width, admit sufficient illumination to the ground floors. The court and yard provisions for downtown buildings, as a rule, tempt the owner to utilize inner and outer courts which serve only a single building; as a result, they are necessarily too small for ade-

quate illumination. The area requirements for garden apartments are, on the other hand, so drawn as to induce owners to group their open spaces, to assemble what would otherwise be many small courts into large open spaces, and instead of locating them in the interior of the building, to place them on the outside of the building where, in conjunction with the open spaces on neighboring property and with streets, they will have a maximum daylighting and sunlighting value not only to their own building but to all buildings.

Apartment-house zones are usually enlarged at the expense of one- or two-family residence zones. Land values in these zones do not demand an intensive development which practically scraps the value of present residence buildings. Zones for garden apartments are designed for multi-family houses, which will not only maintain these values but the permanent value of the apartments by surrounding them with ample open space. As people become more generally aware of the desirability of garden apartments, it is to be expected that regulations for multi-family houses will in an increasing number of cases be lightened so as completely to eliminate the older type of apartment houses from the entire city.

Country Estates and Green Belts. A very salutary development, which was not anticipated at the time the family-per-acre limitation was first introduced, is its application to the protection of large estates. Exclusive residential communities in the country, neighboring large cities, like Oyster Bay, Long Island, demand a minimum area of four acres for a one-family house. This provision has been challenged by various persons on the ground that it bears no relationship to the objects for which the police power may be exercised, and es-

pecially on the ground that it constitutes class legislation. But are these accusations true?

It cannot be denied that both these charges may be amply supported by facts in certain instances. But it would be unfortunate if the police power could not be used to support the requirement of a minimum lot area larger than that of the customary suburban lot with an area of 4,000, 10,000 or 20,000 square feet. First of all, semi-rural suburban communities of country estates occupy a different position in relation to the usual urban conveniences than is the case with the typical, more or less, densely developed suburb. Wells are frequently used instead of city water; septic tanks or cesspools in lieu of sanitary sewers; narrow lanes instead of comparatively wide streets. Then, too, these developments accommodate, as a rule, a considerable number of animals—cows, horses, swine and sheep—not to mention chickens. All these considerations necessitate a much larger plot area in the country than in the city. Sanitation no less than health demands plots of great size. But there are other considerations. Because of the absence of city water, there are no fire hydrants. Such a fire department as exists is, moreover, probably a volunteer department with rather primitive equipment. The fire department is, furthermore, located at a considerable distance from the average house. Safety from fire no less than public health and sanitation, therefore, justify continued maintenance of a sparse development. Such arguments as these it is hoped may persuade the courts to uphold the multi-acre plot requirement as a valid use of the police power.

Should the large acreage plot provision be upheld by the courts, it will speedily find an enlarged field of useful-

ness in aiding to control development of the average city. The outlying undeveloped territory adjacent to a rapidly growing city might, for instance, be placed in a four-, five-, ten- or even twenty- or more acre residence or country zone in order to thwart reckless gambling in suburban real estate values by unscrupulous speculators in unnecessary subdivisions. A large acreage plot requirement would thus enable a city to catch up with its present subdivided areas before new areas were plotted. A city with such a provision in its zoning ordinance would, in other words, control its subdivisions in a manner so that the number of subdivided lots in the community would keep step with growth of population. Above all, the provision would enable cities to give practical effect to the green belt on the outskirts of the urban area which is so essential if the territorial extent of a city is ever to be controlled. Assuming that a sufficient territory is contained within the limits of the city so that its control will not be vitiated by near-by municipalities across the border, the large acreage plot provisions should enable a city of the future so to plan its area that it will be neither ruined from within by uncontrolled and unneeded subdivisions nor exploited from without by inferior standards of development applied by competitive satellite communities across its border. Perfection of the large acreage plot provision into an efficient tool to be used in attaining a green belt about cities, separating urban and rural development, and thus adjusting the platting and marketing of lots to current requirements fixed by population growth or even limiting the maximum area and population within a city in the future, is a matter of such importance to the technique of effective city planning that

it will undoubtedly challenge the attention of the best brains in the planning profession.

Supreme Importance of Open-Space Requirements

Apparently the thought has not yet occurred to many cities that the open space about homes is of as much importance to the health and safety of the community as the exclusion of stores from residence zones; that mandatory front yards may be as influential in preserving home values as restrictions against apartments; that direct limitations upon congestion are absolutely indispensable to prevent a future overcrowding of land. For a city to be zoned today does not necessarily mean anything conclusive in the way of a deed well done, once and for all; of as much importance as the mere fact of being zoned, is the kind of zoning ordinance that controls its development. Indeed, many cities are today laboring under the illusion that a rudimentary use ordinance, adopted years ago and since then many times amended, affords them ample protection, and yet their development is everywhere wide open to serious attack by out-of-place buildings violating the height and bulk standards of different neighborhoods. In their ultimate effect upon the health and happiness of the population, as well as upon the general plan of the community, the open-space requirements laid down in a zoning ordinance may be made to transcend in importance every other phase of zoning. Contrary to the usual impression held by cities, it is not so much the use regulations as the area regulations, when properly designed, that are of supreme importance to its permanent well-being.

The Definition of Navigable Waters and the "Doctrine of Minor Interest"

By LESTER V. PLUM*

IN 1920 Congress established a federal commission and gave it authority to license the construction of electric generating projects by private companies at water-power sites subject to federal control. The terms of the license were designed both to protect the capital investment from confiscation by action of Congress and to protect the interests of the general public in the water resources of the nation. The law was primarily a conservative measure and was not designed to regulate the electric power industry as such. It was known as the Federal Water Power Act.

Although the Federal Power Act of 1935¹ for the first time gave this Federal Power Commission a share in regulating the electric power industry as a whole, the effect of those provisions will not be discussed. Attention will be confined to the effect on the Commission's licensing jurisdiction of certain amendments to the Federal Water Power Act contained in the 1935 legislation. The writer's thesis is that, in view of these amendments, the definition of "navigable waters" which was found in the original Act and which was retained in the Act of 1935 is at least useless and it may have undesirable effects upon the Commission's jurisdiction.

No apology need be made for the limited scope of the subject, because the importance of the Commission's authority over water-power projects will by no

means be eclipsed by its new found jurisdiction over "public utilities."² Licensing of hydro-electric plants will remain important because water resources can be used *jointly* for a variety of purposes, including navigation, flood control, irrigation, and recreation, as well as for generation of electricity. An orderly development of these resources necessitates a planning agency whose jurisdiction can be extended over entire streams and watersheds as units. By virtue of its jurisdiction over water-power sites the Commission can, among other things, require conformity to construction specifications, regulate the discharge of impounded waters, and impose special restrictions upon use of water rights acquired under state law, all in the interest of a coordinated use of water resources for every beneficial public purpose. For these reasons it is assumed, in the discussion to follow, that a liberal construction of the Commission's jurisdiction is economically desirable.

Scope of Jurisdiction

The Commission's licensing jurisdiction rests ultimately upon the right of Congress (1) to require its consent before anyone may occupy power sites located on public lands; and (2) to require its consent for use of waters subject to federal control under the interstate commerce clause.³ We are here concerned

* Instructor in Economics, Princeton University.

¹ Title II of the Public Utility Act of 1935. Part I of this title consists of amendments to the Act of 1920. The Federal Water Power Act (41 Stat. 1063) as amended is a part of the Federal Power Act of 1935 (Title II, Public 333, 74th Cong.).

² Defined as companies owning or operating facilities for transmission or sale of electric power in interstate commerce for ultimate distribution to the public (*Ibid.*, Sec. 201).

³ The power to withhold consent implies the power to grant consent subject to conditions contained in the license. In the words of the Court: "The power to ap-

(Footnote 3 continued on page 399)

only with the nature and extent of the Commission's jurisdiction when no public lands are involved, and when constitutional authority must rest solely on the interstate commerce clause. In such a case federal jurisdiction has been upheld on the ground that, since navigation is a part of interstate commerce, Congress may regulate navigable waterways as agencies of commerce. In determining what waters may properly be considered such agencies, the Supreme Court has made some use of the legal definition of "navigable waters of the United States," which was first formulated in 1851 for the purpose of determining the extent of the admiralty jurisdiction of the federal courts.⁴

Two tests have been created for defining these streams: (1) navigability in fact, that is, "used, or susceptible of being used, *in their ordinary condition*, as highways for commerce, over which trade and travel are or may be . . . conducted in the customary modes"; and (2) interstate character, that is, forming "by themselves, or by uniting with other waters, a continued highway over which commerce is or may be carried on with other States or foreign countries."⁵ A river may be navigable in spite of shoals and other natural barriers compelling land carriage.⁶ And a river which was used a hundred years ago by boats of light draft remains "navigable" at law, even though changed modes of transportation or artificial obstructions

in the stream now prevent its use.⁷

The Court has gone even farther than this in upholding federal authority over waters which would appear to the layman to be anything but navigable. The Act of 1890,⁸ amended in 1899,⁹ prohibited the creation of "any obstruction, not affirmatively authorized by law, to the navigable capacity" of navigable streams, and the Court held that under this Act Congress could control the erection of structures in non-navigable tributaries which might affect the navigability of waters to which they were tributary. Yet these tributary waters were not themselves "navigable waters of the United States."¹⁰ Apparently the test which the Court uses consistently to determine the scope of the admiralty jurisdiction of the federal courts¹¹ breaks down when applied to the authority of Congress under the commerce clause. If it did not break down we should have to conclude that Congress could never *promote* interstate commerce by improving streams which were not already navigable.

This is not to say that the legal concept of "navigable waters of the United States" has no significance when applied to federal control of water resources. It has been used to determine whether compensation must be paid when assertion of federal jurisdiction over navigation results in damage to private water rights. In the case of "navigable waters of the United States" the Court has held that private water rights are subservient

(Footnote 3 continued from page 398)

prove implies the power to disapprove and the power to disapprove necessarily includes the lesser power to condition an approval." (*Southern Pacific Co. v. Olympian Dredging Co.*, 260 U. S. 205 (1922); see also *Fox River Paper Co. v. Railroad Commission*, 274 U. S. 651 (1927).)

⁴ *The Genesee Chief*, 12 How. 443.

⁵ *The Daniel Ball*, 10 Wall. 557 (1871). Italics supplied; the importance of the italicized section will be apparent in the discussion to follow.

⁶ *The Montello*, 12 Wall. 430 (1874).

⁷ *Economy Light and Power Co. v. United States*, 256 U. S. 113 (1921).

⁸ 26 Stat. 454.

⁹ 30 Stat. 1151.

¹⁰ "Obviously, the Rio Grande within the limits of New Mexico is not a stream over which in its ordinary condition trade and travel can be conducted in the customary modes of trade and travel on water." (*United States v. Rio Grande Dam and Irrigation Co.*, 174 U. S. 690, 699 (1899).)

¹¹ See footnote 4 above.

to the paramount use for navigation and that the Government need not pay any compensation for taking them away. Thus, by federal construction of a dyke or a pier, an owner of riparian land may be prevented from having access to the water flowing past his land, yet he is entitled to no compensation.¹² On the other hand, if the waters are not "navigable" in the eyes of the law, the Federal Government must pay just compensation for any private water rights destroyed or taken as a result of the exercise of its authority under the interstate commerce clause.¹³ It is important to note, however, that this legal status of the waters does not necessarily preclude assertion of federal authority under the commerce clause when proper compensation is made.

A Useless Distinction

If this is a reasonable interpretation of the significance of the concept of navigability, why was it necessary, in the Act of 1920, to require the Commission to determine whether waters were "navigable" according to a definition of navigability included in the law? It could not have been for the purpose of determining whether private water rights were subservient to other uses authorized by the Federal Government or whether compensation need be made by licensees for any such rights destroyed. Regardless of the legal status of waters, licensees are expressly made liable for all damages to the property of others.¹⁴

¹² *Gibson v. United States*, 166 U. S. 269 (1879); *Seranton v. Wheeler*, 179 U. S. 141 (1900).

¹³ *United States v. Cress*, 243 U. S. 316 (1917). For a discussion of this case in the Congressional debates on the federal water power bill, see 56 *Cong. Rec.* 9291, 65th Cong., 2d Sess.

¹⁴ Sec. 10 (c) of the Federal Water Power Act. As a result of this provision the Supreme Court has held that licensees must pay compensation for damages to water rights in "navigable waters of the United States," even

On the other hand, if the framers of the Act be presumed to have acted with the conviction that federal jurisdiction under the commerce clause was narrowly restricted to "navigable waters of the United States," as usually defined, whether compensation was paid for water rights or not, then the definition of "navigable waters" that they included in the Act must indeed be considered a "brazen effort to extend . . . jurisdiction beyond . . . constitutional limits."¹⁵ "Navigable waters of the United States" must be navigable in their *natural state*.¹⁶ The definition in the Act embraces those waters which are navigable as a result of *improvements*. Furthermore, it includes "such other parts of streams as shall have been authorized by Congress for improvement by the United States or shall have been recommended to Congress for such improvement after investigation under its authority." Apparently, the mere fact that Congress has at some time in the past authorized an improvement, however slight, or that a recommendation for improvement has been made, even if never acted upon, is sufficient to empower the Commission

though these same rights would have been subject to destruction without compensation under the authority of the Federal Government to regulate navigation. (*Henry Ford and Son v. Little Falls Fibre Co.*, 280 U. S. 369 (1930).) The provision is also found in the Federal Power Act of 1935 as Sec. 10 (c).

¹⁵ Mr. Raker, in the House, May 4, 1920. (59 *Cong. Rec.* 6530, 66th Cong., 2d Sess.)

¹⁶ See footnote 5 above. It is true that, in the *Cress* case (footnote 13), the Court held that an interstate stream which was navigable solely as a result of artificial improvements by the Federal Government became "navigable waters of the United States" subject to federal regulation under the commerce power. But, inasmuch as the stream, prior to improvement, was not navigable in fact, this is merely another way of saying that the definition of "navigable waters of the United States" laid down by the Court in previous cases is not significant as a check on federal authority to protect or promote interstate commerce, but rather of importance only for determining the nature and extent of private water rights for which compensation must be paid.

to assert its licensing jurisdiction. This appears to be a rather arbitrary rule, at least for determining the present "navigable" status of waters.¹⁷ The remainder of the definition, which includes waters "used or suitable for use . . . in interstate . . . commerce," follows more closely the pronouncements of the Court but the statutory definition as a whole is broader than the judicial concept of "navigable waters of the United States."¹⁸

Despite the scope of the statutory definition, the purpose of including it in the Act, curiously enough, was to *restrict* the Commission's jurisdiction. The rather general recognition in Congress that federal jurisdiction could be extended constitutionally, in certain cases,

to the tributaries or headwaters of navigable streams explains why separate provision was made in the Act for waters "other than those defined . . . as navigable." The Commission was empowered to assert jurisdiction over such waters upon a finding that "the interests of interstate or foreign commerce would be affected" by construction of a power project, but only after a "declaration of intention" to construct the project had been *voluntarily* submitted.¹⁹ After a declaration was filed, if the Commission found that no interests of interstate commerce were involved, no license would be required and, according to the Act, the declarer would have federal permission to proceed with construction. Although neither the courts nor the attorney generals ever decided what the effect of such a finding was, the Commission concluded that it stopped the Federal Government from later ordering removal of the project as a nuisance to navigation. The sole inducement to file a declaration of intention was thus the *risk* that, in the absence of a license from the Commission or a finding that the interests of commerce would not be affected, the project might at some time in the future be declared an obstruction to navigable capacity contrary to the Act of 1899²⁰ and subject to removal without compensation.

As long as the filing of declarations of intention remained discretionary it was important that the Commission make a distinction between waters that came within the definition in the Act and those that did not. The Commission might find, and often did find, *both* that waters were navigable and that the interests of interstate commerce were involved. But, *in the absence of a declaration of intention voluntarily submitted*, the Commission

¹⁷ The Commission has not applied this rule consistently. In some cases, even though federal money had actually been spent for improving the stream, jurisdiction was relinquished on the ground that the waters were not being used, or could not be used at present, for navigation. (See Federal Power Commission: Decisions on Declarations of Intention, Oct., 1926, Washington (mimeographed), p. 57.) In one such case the Commission refused to assert jurisdiction in the face of a district engineer's report that the power site was located in navigable waters "in strict accordance with the definition" in the Act (*Ibid.*, pp. 126-7). Such decisions cannot be reconciled with others in which the Commission apparently rested jurisdiction largely, if not solely, on the ground that the waters in the past had been improved for navigation, or improvement had been recommended or authorized. (See, e.g., formal minutes in 2d Annual Report, pp. 101, 149.)

¹⁸ The full text of the definition is as follows: "... 'navigable waters' means those parts of streams or other bodies of water over which Congress has jurisdiction under its authority to regulate commerce with foreign nations and among the several States, and which either in their natural or improved condition notwithstanding interruptions between the navigable parts of such streams or waters by falls, shallows, or rapids compelling land carriage, are used or suitable for use for the transportation of persons or property in interstate or foreign commerce, including therein all such interrupting falls, shallows, or rapids, together with such other parts of streams as shall have been authorized by Congress for improvement by the United States or shall have been recommended to Congress for such improvement after investigation under its authority;..." (Sec. 3 (7) of the Federal Water Power Act of 1920; Sec. 3 (8) of the Federal Power Act of 1935.)

¹⁹ Sec. 23 of the Federal Water Power Act of 1920.

²⁰ See footnotes 8 and 9 above.

could never assert jurisdiction over a water-power site located in non-navigable waters, solely on the ground that the interests of interstate commerce would be affected by construction of a project. For example, the Town of Andrews, North Carolina, proposed to construct in non-navigable waters a dam that would interfere with another power project for which a permit²¹ had been issued by the Commission. It was found that the project under permit would be of material benefit to the navigable capacity of the Tennessee River, but the Commission was unable to obtain jurisdiction over the conflicting project because the mayor of the town refused to submit a declaration of intention.²² A project located in "navigable waters" would have been in trespass, and its construction could have been enjoined.

To prevent the Commission from asserting jurisdiction on its own motion in certain cases was the only reason for including a definition of navigable waters in the Act. A finding that the interests of interstate commerce would be affected by construction of a power project would seem to be as sound a constitutional basis for asserting jurisdiction as a finding that the project would be located in waters coming within a definition which does not follow the judicial definition closely and which involves certain arbitrary tests for navigability. The Federal Power Act of 1935 has removed the need for retaining this definition by giving the Commission authority to investigate

"any occupancy of, or evidenced intention to occupy, for the purpose of developing electric power . . . bodies of water over which Congress has jurisdiction under its authority

to regulate commerce; . . . and to issue such order as it may find appropriate, expedient, and in the public interest to conserve and utilize the navigation and water-power resources of the region."²³

Apparently, the Commission's jurisdiction is now co-extensive with that of Congress.²⁴ Furthermore, the Act *compels* the filing of declarations of intention to construct projects in waters which are not navigable according to the definition in the law.²⁵ Yet this very amendment to the Act of 1920, paradoxically, obviates the necessity of making a distinction between navigable and non-navigable waters.

A Dangerous Distinction

The very fact that the distinction is useless for achieving the purpose that the framers of the Act of 1920 originally intended makes retention of the definition of navigable waters in the 1935 legislation dangerous, for it lends support to the contention that there must have been some other valid reason for differentiating between the two types of waters. One reason that might be advanced is that the jurisdiction of Congress, and hence of the Commission, over non-navigable waters is much narrower in scope than that over navigable waters. The Commission has been fighting this argument in the courts for the past six years. Because the contention has been that the "interests" of interstate commerce that are affected by construction of projects in non-navigable waters are "minor" in extent, the writer has coined the expression "doctrine of minor interest" to designate the argument.

²³ Sec. 4 (g). Italics supplied.

²⁴ See Solicitor De Vane's testimony in Hearings on H. R. 5423, House Committee on Interstate and Foreign Commerce, 1935, p. 470.

²⁵ This is the effect of the revised wording of the Act, according to the Commission (*Ibid.*, p. 391). The law reads to the effect that declarations "shall" be filed (Sec. 23 (b)).

²¹ A permit is designed to assure priority of right, during the period of preliminary investigation of the site, to receive a license if and when issued.

²² Chief Counsel. Conflicting Projects—Injunction, Feb. 19, 1924. 4th Annual Report, pp. 114-5.

In order to explain the origin of this doctrine it is necessary to call attention to a provision in both the original and amended acts which allows the Commission, under certain circumstances, to issue a license which does not include all the usual conditions and requirements. Such a license is known as a "minor license" and it is issued for what the Act designates as a "minor part" of a complete project.²⁶ This provision of the law was intended to apply only to projects occupying public land, when the land was not so strategically located as to prevent development of a water-power site without a license. That is, the amount of public land in the area occupied by the project would be small, and it would be desirable but not imperative that a relatively unimportant or "minor" part of the complete project be located on government property. The doctrine of minor interest represents an attempt to extend the meaning of this provision. The argument is that a project which occupies no public land and is located in non-navigable waters must be authorized by a minor license because the interests of interstate commerce that are affected constitute a very "minor part" of the interests involved when waters are navigable.

The essence of the argument is that Congress can prevent the construction of projects in non-navigable waters only if they threaten the navigable capacity of navigable waters. Since this is the basis for withholding permission, permission must be granted subject only to conditions which are directly related to the prevention of *adverse* effects on navigation.²⁷ No consideration is to be given

to the possibility that navigation may be *improved* by federal regulation of water-power projects, or that other interests of interstate commerce aside from navigation may be at stake. This is a particularly pernicious doctrine because use of waters for navigation, although important, may not be more important than other concurrent uses which, under adequate regulation, may be compatible with navigation. Since protection or promotion of the interests of navigation necessarily affects the value of flowing waters for other purposes, such as generation of electricity, irrigation, or flood control, to deny a federal agency any authority over these concurrent uses is to destroy its major value as a planning body.

The argument that federal authority over water-power sites located in non-navigable waters was of such narrow scope was first presented to the Commission in 1928 by the Appalachian Electric Power Company, which was seeking to develop a power site in New River, near Radford, Virginia. The year before, the Commission had held that the power site was not in navigable waters as defined in the Act, but that a license would be necessary to protect the interests of interstate commerce.²⁸ By 1930 the doctrine of minor interest had received the official endorsement of the Attorney General of the United States,²⁹ and the

might be called a "consent jurisdiction theory," that either a project will impair navigable capacity, in which case the Government could not permit its construction under any conditions, or the project will not impair navigable capacity, in which case the Government has no power to withhold its consent. (Le Boeuf, R. J., "State or Federal Control of the Water Powers of Navigable Streams," 15 *Georgetown Law Journal* 201-33 (March, 1927)). Such an argument overlooks, of course, that whether a project affects navigation unfavorably or favorably depends in large part upon the extent to which it is subject to regulation.

²⁶ 6th *Annual Report*, p. 133.

²⁹ Issuance of License for Water Power Development on New River, Virginia, 36 *Op.* 355 (Sept. 22, 1930).

²⁶ Sec. 10 (i) of both the Act of 1920 and the Federal Power Act of 1935.

²⁷ The concept that the interests of the Federal Government are purely negative—to prevent injury to existing navigation—may even degenerate into what

following year the Appalachian Electric Power Company started legal action against the Commission.³⁰ The doctrine was completely overthrown in 1933 by the District Court of the United States for the Western District of Virginia,³¹ but the force of the opinion was nullified by a decision of the Circuit Court of Appeals, which remanded the case to the lower court with directions to dismiss for want of jurisdiction.³² The Supreme Court refused to review the case on the ground that, until the Company started work on the project and the Commission attempted to enjoin construction without a license, a decision on the legal issues would be premature.³³ According to the Commission's latest annual report the United States has brought suit to enjoin construction of the project,³⁴ but at this writing the fate of the "doctrine of minor interest" is still undetermined. No attempt will be made to forecast the ultimate decision of the Supreme Court on this issue. However, it is clear that no basis should be given in the Federal Power Act for an argument before the Court that the statutory distinction between navigable and non-navigable waters indicates Congressional recognition of the "doctrine of minor interest." The very fact that the distinction serves no other purpose makes it all the more dangerous.

³⁰ The suit was brought against the commissioners as acting unconstitutionally in creating a cloud on the Company's title to riparian lands.

³¹ *Appalachian Electric Power Co. v. Smith*, 4 Fed. Supp. 6 (1933).

³² *Appalachian Electric Power Co. v. Smith*, 67 F. (2d) 45 (1933). The court held that no action of an administrative agency, the validity of which depends upon its constitutionality, can constitute a cloud upon title to property. Since the suit could not, therefore, be *in rem*, the commissioners as residents of the District of Columbia could not be sued in Virginia. Furthermore, in the absence of any threat of immediate action by the commissioners, the petition for an injunction amounted to a request for a declaratory judgment.

³³ Memo. 729, Adv. Op., Vol. 78, p. 562 (1934).

³⁴ 16th Annual Report, p. 26.

This danger is sufficient reason for discontinuing the distinction in the Act, but there are other possible advantages in resting the Commission's jurisdiction solely on a finding that the interests of interstate commerce are affected, ignoring the status of waters with respect to navigability. In view of the flexibility and adaptability of the interstate commerce power, such a finding is desirable because it leaves the courts free to take cognizance of federal authority over matters other than navigation which might conceivably be held to constitute interstate commerce or to involve interests of commerce. Furthermore, it is probable that the courts will accord a large degree of administrative finality to a finding that the interests of commerce are affected. This is indicated by the decision of the District Court in 1933, already referred to.

Although this decision was overruled on a technicality, it is significant that the Court took no judicial notice of a long period of controversy within the Commission concerning the navigable status of the waters,³⁵ and upheld the

³⁵ The Commission has been confused concerning the legal effect of its findings, that is, whether a finding that waters are navigable constitutes an administrative determination of the legal status of waters in accordance with the judicial concept of "navigable waters of the United States." It would seem that the definition of navigable waters in the Act should be considered solely as a mandate from Congress to assert jurisdiction for purposes of administering the Act, since the Commission cannot determine the nature and extent of private water rights. The Commission has also been uncertain whether it need make any finding regarding navigability, except when it was necessary to do so in order to enjoin construction of a project in the absence of application for a permit or license or in the absence of a declaration of intention. As long as the Act makes a distinction between the two types of waters, however, it might appear to be an abuse of administrative discretion to fail to find that certain waters are navigable. The decisions concerning New River illustrate this confusion and uncertainty. As early as 1921 the Commission declared this river to be a "navigable waterway of the United States." A finding that the stream was "navigable

(Footnote 35 continued on page 405)

Commission's authority to require a major license³⁶ solely on the ground that the interests of interstate commerce would be affected. Judge Luther Way, who wrote the opinion, pointed out that the power of Congress was not narrowly restricted to preventing injury to existing navigable capacity, but extended to improving the navigability of streams which were potentially useful as waterways. Since Congress must be granted wide discretion in deciding what conditions were necessary to protect federal interests in navigation, Judge Way was unwilling to say that the provisions of a major license bore no positive relation to the regulation of interstate commerce, and refused to question the Commission's finding that those interests would be affected, since the finding was not arbitrary or based on insufficient evidence.

(Footnote 35 continued from page 404)

waters" in accordance with the definition in the Act would have been more appropriate. In 1926 the Commission found that the interests of interstate commerce would be affected by construction of a project in the site near Radford, Virginia, and that it need not find the waters to be navigable in order to assert jurisdiction. The next year, however, the Commission definitely stated that the waters were not navigable. This finding was criticized in 1930 by the acting Chief Counsel on the ground that Congress in the past had authorized surveys and appropriated money for navigation improvement, which brought the waters within the statutory definition. In 1931 the Commission was divided on the question, a majority being of the opinion that the waters need not be found navigable in order to assert jurisdiction, the minority being in favor of a finding that the site was located in navigable waters as defined in the Act.

³⁶ A major license subjects the licensee to all conditions and requirements of the Act.

Conclusion

It would seem that nothing would be lost and much might be gained by discontinuing the distinction between navigable and non-navigable waters in the Federal Power Act of 1935. The purpose of making the distinction in 1920 was to prevent the Commission from asserting jurisdiction on its own motion over non-navigable waters, although the definition of navigable waters was itself actually broader than the judicial concept and contained some rather arbitrary tests for navigability. There was no need of retaining this definition in the Federal Power Act of 1935, which removed this statutory "restriction" and made the Commission's jurisdiction co-extensive with that of Congress under the commerce power. To retain the distinction between the two types of waters may possibly lend support to a doctrine which would confine the Commission's constitutional authority over many power sites within very narrow limits, thus impairing the value of this federal agency as a planning body. On the other hand, it is highly probable that a finding which ignores the navigable or non-navigable status of waters but which asserts that interests of commerce are affected will be accorded a large degree of administrative finality by the courts and will encourage a liberal judicial construction of the Commission's jurisdiction.

Recent Trends of Telephone Stations in Wisconsin

By ROBERT G. DUDLEY*

TELEPHONES in service in Wisconsin, as elsewhere, declined appreciably for the first time in recent history during the period from 1930 to 1933. In Wisconsin this decline amounted to 19% between December 31, 1930 and December 31, 1933. Three years later not quite $\frac{1}{2}$ of this loss had been regained.

A better understanding of these fluctuations is obtained by comparing the trends in business, residence, and rural telephones. Each of these classes of service is influenced by a different set of factors, and study of the trend of each leads to a better understanding of the trend of the whole.

The data used in making this comparison are compiled from the annual reports made by the telephone companies to the Public Service Commission of Wisconsin. The actual figures, which are shown in Table I, have been converted to index numbers on a 1929 base and are presented graphically on Chart I. In order to show fluctuations immediately prior to the depression, data beginning with 1927 are shown.

Trends of Telephone Stations

Chart I indicates that business telephones have been most stable, residence telephones less constant, and rural telephones least stable.

Business telephones did not start to decline until 1931 and then only slightly. The total decline between 1930 and 1933 was only 10%. This relative stability is probably attributable to the fact that telephones are necessary to most business enterprises. The large number of

businesses which ceased operations because of failure or other causes during the period partially explains the decline. Furthermore, the low ebb of business activity enabled existing firms to get along with fewer telephones than before.

It is interesting to note that business telephones were increasing at the rate of about 5% per year in the two years before the depression. The comparative stability during the depression, together with the satisfactory recovery since that time, indicates that this upward trend was halted only temporarily, and that it may be expected to continue in the immediate future.

Urban residential telephones declined 19% between 1930 and 1933. A portion of this decline was brought about by the "doubling up" of families during the depression. Other families were forced to give up their telephones because of decreased income.

Residential and business telephones were rising in 1928 and 1929 at approximately the same rate. Since 1933 residential telephones have increased more rapidly than business telephones although the latter, because of the smaller decline during the depression, were closer to their 1930 peak. At the present rate of increase the 1930 level in residential telephones will be reached sometime in 1938.

Rural Telephones

The most significant losses during the depression took place in rural telephone service. Rural telephones held at an approximately constant level during the period 1927 to 1929. They decreased throughout the depression, recording a

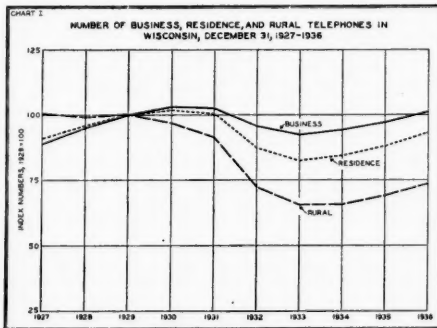
* Junior Statistician, Public Service Commission of Wisconsin.

TABLE I. NUMBER OF BUSINESS, RESIDENCE, AND RURAL TELEPHONES IN WISCONSIN, 1927-1936*

Year	Number of Telephones			Index Numbers (1929 = 100)		
	Business	Residence	Rural	Business	Residence	Rural
As of December 31:						
1927	129,190	255,660	117,360	89.0	91.0	100.6
1928	137,900	268,450	115,620	95.0	95.5	99.1
1929	145,120	281,000	116,700	100.0	100.0	100.0
1930	149,850	286,290	113,320	103.3	101.9	97.1
1931	149,340	282,700	107,050	102.9	100.6	91.7
1932	138,340	246,890	84,170	95.3	87.9	72.1
1933	134,280	232,920	76,890	92.5	82.9	65.9
1934	136,440	238,300	76,690	94.0	84.8	65.7
1935	140,290	247,760	80,850	96.7	88.2	69.3
1936	146,700	261,900	85,900	101.1	93.2	73.6

* About 99% of the telephone industry in Wisconsin is represented in these data.

21% decline in 1932 alone. The total decline from 1929 to 1934 amounted to a little more than $\frac{1}{3}$, and only about $\frac{1}{4}$ of the losses had been regained by December 31, 1936.



In considering the statistics of rural telephones in Wisconsin, it is well to remember that the telephone industry is so organized that a large part of rural telephone service is supplied by hundreds of small companies, many of which are subscriber-owned. Class A and B telephone companies (those with annual revenues in excess of \$50,000) served 92% of the urban telephone customers in the State as of December 31, 1936. At the same date these same companies served only 41% of the rural customers. Even these percentages do not give a

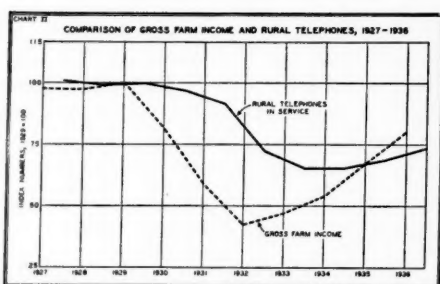
true picture of the original organization of the industry because a portion of the rural plant now controlled by large companies was originally constructed by small locally-owned companies.

It is evident from these figures that the telephone industry was built up by different methods in rural than in urban areas. Probably telephone service developed much more rapidly in rural sections under this type of organization than it would have if the field had been left to the larger companies. In many cases subscribers donated much of the labor and materials necessary in erecting lines, or at least expected no return on their investment in subscriber-owned companies. Under such organization telephone service was made so economical that a high percentage of potential telephone users were able to obtain service. Much of this development took place many years ago, and it is perhaps only natural, particularly in view of the lack of growth in rural population, that rural telephones failed to increase during the period 1927 to 1929.

Gross Farm Income and Rural Telephones

Obviously the sharp curtailment of farm income during the period from 1929

to 1933 had much to do with the decrease in rural telephones. Chart II shows the relationship between Wisconsin gross farm income, as estimated by the Wisconsin Department of Agri-



culture and Markets, and rural telephones. Both series of data are expressed in terms of index numbers on a 1929 base. The series representing gross farm income is plotted at the mid-point of each year, whereas the series representing telephones in service is plotted at the end of each year. This is to compensate for the fact that the data on telephones are as of December 31, whereas the data on farm income apply to the entire year.

The chart clearly shows a tendency on the part of farm income to anticipate changes in rural telephones. While farm income was falling rapidly in 1930 and 1931, not until 1932 did farmers in great numbers decide to dispense with telephone service. Similarly, farm income had risen nearly three years before telephones in service reflected that rise.

Rural Electric Customers and Rural Telephones

The rapidity of the decline in rural as compared with urban telephones, together with the comparative lack of vigor in the revival which has taken place in rural telephones, cannot but lead to the suspicion that a portion of the loss of rural telephone service which

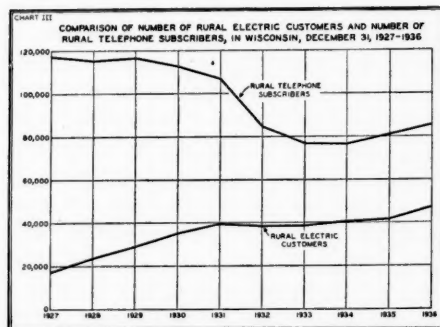
has taken place has been caused by factors other than loss of income.

Chart III and Table II, which compare rural electric consumers with rural telephones, tend to bear out this hypothesis. In order to show the comparative extent of development in the two industries, the actual data rather than index numbers are shown.

TABLE II. COMPARISON OF WISCONSIN RURAL ELECTRIC CUSTOMERS AND RURAL TELEPHONE SUBSCRIBERS

Year	Rural Electric Customers	Rural Telephone Subscribers
As of December 31:		
1927	17,388	117,360
1928	23,830	115,620
1929	28,852	116,700
1930	34,953	113,320
1931	39,459	107,050
1932	38,109	84,170
1933	38,194	76,890
1934	40,144	76,690
1935	41,790	80,850
1936	47,862	85,900

Comparing the two series during the early part of the depression, it may be seen that, while many farmers were receiving electric service for the first time,



other farmers were ordering their telephones disconnected. This seems to indicate that at least a portion of the farmers giving up their telephone service did not do so through absolute necessity.

During 1936 a greater increase took place in rural electric customers than in rural telephones. This raises at least two questions: (1) whether farmers are now in the position of choosing between re-connecting their telephones or connecting to newly built rural electric lines, and (2) what their choice will be if they decide that they cannot afford both services. In view of the fact that a high percentage of the farmers without telephone service were able to obtain it without contributions, whereas many farmers who desired electric service were unable to do so, it appears that farmers may have been more anxious to obtain electric service than telephone service. It must be remembered, however, that there are still more telephone users than electric customers, and it is possible that all or nearly all the latter also have telephone service.

Grounded and Metallic Rural Telephone Service

While no accurate figures are available, it is estimated that between 30% and 40% of the rural telephones in Wisconsin are on grounded lines. In localities where electric distribution lines are being constructed, many grounded telephone lines may have to be metallicized. The current controversy between REA officials and telephone companies on the question whether the latter shall receive any assistance from the rural electric co-operatives in this work may have far-reaching effects on rural telephone companies, many of which claim that they are not in a position to metallicize their lines unless they receive assistance. In most instances, it is also claimed that rates on metallic lines must be higher than those on grounded lines.

In order to obtain a comparison between results in recent years on grounded lines, as opposed to metallic, 60 ex-

changes were selected for study, 30 of which reported grounded service only on all rural lines and 30 of which reported metallic service only. The number of company-owned rural stations which excludes those on switched lines at each of these 60 exchanges was tabulated for 1929, 1933, and 1936. The results are shown in Table III, the data being expressed in index numbers on a 1929 base.

TABLE III. COMPARISON OF RESULTS ON METALLIC AND GROUNDED LINES

	1929	1933	1936
Metallic Lines:			
15 Exchanges with highest monthly rate; median rate—\$2.00	100.0	60.2	66.4
15 Exchanges with lowest monthly rate; median rate—\$1.50	100.0	70.5	77.2
30 Exchanges (total selected); median rate—\$1.75	100.0	66.3	72.9
Grounded Lines:			
15 Exchanges with highest monthly rate; median rate—\$1.50	100.0	66.5	73.0
15 Exchanges with lowest monthly rate; median rate—\$1.25	100.0	71.7	75.7
30 Exchanges (total selected); median rate—\$1.34	100.0	69.4	74.6

Telephones on grounded lines did not decline as rapidly as those on metallic lines. This is apparently explained by the difference in the level of rates prevalent for the two types of service. On the basis of the rates in effect as of December 31, 1936, the median rate of those exchanges offering metallic service was \$1.75 as compared with \$1.34 at the exchanges offering grounded service.

In order to show more clearly the effect of the level of rates on the trend of stations, each group has been divided into two parts, those with the highest rates and those with the lowest. The results of this division show that the rate level appears to have been an important factor affecting the amount of the decline in stations served.

Exchanges with metallic lines recorded a larger increase during the period following the depression despite the higher rates in these exchanges. This may be taken to indicate that customers on such lines were more anxious to reconnect than were those on grounded lines. A further indication that customers prefer metallic service is shown by comparison of the declines in lowest rate metallic exchanges and highest rate grounded exchanges. The median rate in both of these groups was \$1.50 but telephones on grounded lines declined more rapidly.

Possible Explanations of the Trend of Rural Telephone Stations

Some of the factors which are tending to slow up the increase in rural telephones may be summed up as follows:

1. Such developments as the modern automobile, the radio, and the widespread construction of all-weather highways may have led the farmer to believe that telephone service is no longer essential.

2. Rural telephone plant, in some instances, may have been allowed to deteriorate to the point that service is no

longer satisfactory. In some cases it is probable that a large amount of reconstruction work will have to be completed before former subscribers can be reconnected.

3. A corollary of the above factor is that of obsolescence. Little effort has been made to modernize rural telephone plant, most of which was constructed many years ago.

The severity of the decline in rural telephone stations, together with the apparent lack of eagerness on the part of farmers to reconnect, may indicate that the telephone industry in rural areas is entering a period of gradual decline. This does not mean that the trend during the next few years will be downward, as the reverse is more likely to be the case. It is probable that modernization of rural telephone plant would tend to check the decline unless the companies were to insist on such high rates that the effect of the improved service would be neutralized. The situation is a peculiar one which may lead to a decline in rural telephones during a period of reconstruction, followed by a period of gradual growth, at a somewhat slower rate than in the cases of urban telephone users.

Urban Land Department

MORTON BODFISH, *Editor*

Collective Home Ownership: A New Activity for Savings and Loan Associations

INDIVIDUAL home ownership, especially in large cities, is becoming more and more improbable with the changing economic conditions and the mobility of the population. Under such circumstances people should only purchase homes when they are permanently located in the community and when they have economic security which will enable them to keep up interest and amortization payments on the mortgage loans. At present, in case a home owner has to leave the city, disposition of his house will cause him trouble. He must either sell or rent it. In either event he may suffer losses. Therefore, many people who have the means to acquire a home prefer to live in rented quarters.

But home ownership need not necessarily be individual home ownership; it can also be collective home ownership. Let us assume that a builder erects a development of 100 homes of the same size. However, he does not intend to sell them individually; he forms a corporation and each prospect subscribes 1/100 of the capital stock. The purchaser as tenant-owner has to pay to the corporation as rent the same amount as he would have to pay as an individual owner in the form of interest and amortization returns, taxes, and insurance. He has to pay even more, because his rent would include a certain percentage for management and rent losses. But, if he gives up his home, his obligation to pay rent is terminated after a relatively short time according to his proprietary lease and the corporation has to rent the dwelling anew. The former tenant-owner is still in possession of his stock, but he can sell it to his successor who will not be admitted to the corporation without being a stockholder.

Such a cooperative housing scheme is not new in this country. Most of the cooperative apartments, however, were only another form of real estate promotion and, except in one case, were not created to provide better housing at lower rentals for people with moderate incomes. Even had they

pursued such ends, they would have been a failure because of the lack of proper financial institutions for inaugurating and supervising such enterprises. Since no one will be inclined to subscribe for stock in a housing corporation which exists only on paper and in promises, the financial institution has to form the corporation and to take over the entire capital stock. After the dwellings have been completed or are under construction and the rentals seem to be satisfactory, it will be relatively easy to find prospects. Few of the future tenant-owners, however, will be able to pay the subscribed stock in a lump sum; most of them can only make instalments. But even when the financial institution has been reimbursed for its entire outlay, its activities are not terminated. A tenant-owner moves and wants his money back. His successor again can only pay on the stock in instalments. Here the financial institution has to acquire the stock and sell it to the new tenant-owner on credit. The picture may become even more complicated. Suppose a tenant-owner who gives up his dwelling is two months in arrears with his rent. The dwelling remains vacant for another month before it can be rented again. The financial institution which purchases the stock has to deduct three months' rent and forward the amount to the corporation which has a first lien on the stock.

To secure good management, the financial institution would have the duty of permanent supervision and control of the housing corporation. In cooperative housing the position of the manager is rather difficult. He is at the same time the boss and the employee of the tenant-owners and responsible to the board of directors elected by them. If the manager is lenient to the tenant-owners, he will be in favor with them, but this policy may endanger the corporation. If he is more concerned for the enterprise than for the welfare of the individual, he will be less well liked. Since the tenant-owners have neither knowledge of nor experience with housing management, it may be easy

for a demagogue to organize a faction among the tenant-owners with the purpose of dismissing the manager and replacing him by the leader of the opposition. Such a change in management may break the corporation. To avoid this and other disturbances, the financial institution should be represented permanently on the board of directors.

Such a cooperative housing venture is not a renting proposition in some fancy form. The dividends of the corporation are to be limited to 5% or 6% by statute, or still better, no dividend should be declared at all since the tenant-owners would have to pay it in their rentals. The propriety lease should state that the rentals can only be increased if required by higher expenses and that no tenant-owner can be dispossessed as long as he pays his rent according to the terms of the lease. Collective home ownership has all the advantages of individual home ownership except the possibility of selling at a profit, but it has none of its disadvantages. The equity is secured against losses and can be transformed into cash when the tenant relationship is terminated.

Housing developments can be erected in the form of one-family houses, detached, semi-detached or row houses, or in the form of apartment houses. The more dwellings they have, the lower are the expenses per dwelling for operating costs, rent losses, etc.

I feel that savings and loan associations are the proper financial institutions to start, supervise, and control cooperative housing. If federal and state charters do not permit this kind of business, they could be amended. The advantages for the associations would be the promotion of a more flexible form of ownership and a profitable investment which will liquidate itself in a relatively short time.

The amount of capital stock in total, and for each tenant-owner, depends on the percentage of mortgage loan to total cost which should be 85%, or even 90%. Assuming that the total cost of a dwelling amounts to \$5,000, an equity of 10% would amount to \$500. If a project of 500 dwelling units were built, the total capitalization would amount to \$2,500,000, and the capital stock to \$250,000. On this theory the savings and loan association would have to subscribe and pay for the entire capital stock, but practically the cash required could be considerably reduced. Before the corporation can be

formed, the land has to be selected, the plans have to be made, etc. Assuming that the price of the land would be \$200,000, the landowner would be satisfied with a relatively small down-payment, take over the balance in capital stock of the corporation, and sell it to the savings and loan association sponsoring the project on terms synchronized with the expected instalments of the future tenant-owners.

After the development is ready for occupancy each prospect would have to subscribe an average of \$500 in capital stock, the exact amount varying with the size of the apartment. He would have to make a down-payment of at least \$100 and pay instalments of at least \$20 a month for 20 subsequent months. In fact, he would purchase shares on credit from the association and he would have to pay 6% interest on the balance, whereas dividends, if any, would be credited to him. Initial and monthly payments on the stock would be collected by the corporation and forwarded to the association.

The mortgage loan at 90% of the total cost of \$2,500,000 would amount to \$2,250,000. The average savings and loan association would not be able to make such a large loan. But it could be subdivided into smaller shares to be taken over by several associations.

Only a relatively small number of large-scale housing developments on an economic, self-liquidating basis are in existence in this country. Some of them were financed by philanthropists and foundations, such as the Michigan Garden Apartments in Chicago, by the late Julius Rosenwald. In past years PWA made loans to eight limited-dividend housing corporations in amounts approximating 85% of total cost, but changed its policy to federally owned, subsidized housing projects for low-income groups. At present, the Rental Housing Division of the FHA insures mortgages on large-scale housing projects up to 80% of total cost. The real accomplishment of this division is not the insurance, but rather the technical, architectural, and financial examination and revision of the projects. If the rentals of such developments in large cities would not exceed \$11 or \$12 per room per month, as in the limited-dividend projects financed with PWA loans, they would also be 100% rented. The percentage of occupancy will

be equally high even in the event of another depression. Under such circumstances certainly a number of tenant-owners will be unable to fulfill the terms of their leases. However, many others paying \$25 per room per month will be only too glad to find living quarters for half of this amount.

Large-scale housing is even more of a necessity in this country with its hot summers and its noisy streets than in Europe where the climate is more moderate and the number of cars and trucks is much less. Large-scale housing as, for example, apartment buildings covering at the most 40% of the land, with cross-ventilation for each apartment, large interior courts and playgrounds for the children, represents great progress in comparison with the average privately owned and operated apartment house. Large-scale housing contributes considerably toward the improvement of the living conditions and health of its occupants. If the houses are solidly built and are furnished with modern equipment, their lifetime can be estimated at 50 years and the period of amortization of the mortgage can be extended correspondingly. It would be wrong, however, to amortize mortgage loans on large-scale housing in the same way as for one-family houses—namely, by payment of an annuity (monthly, quarterly, or semi-annually) during the entire amortization period. It seems advisable to amortize each year 2% of the principal and to pay interest merely on the balance. In the first year interest payments on the assumed mortgage of \$2,250,000 at a rate of $4\frac{1}{2}\%$

would amount to \$101,250, and the amortization payments to \$45,000. In the second year the balance would be \$2,205,000; interest payments would amount to \$99,225. The amortization would remain the same at \$45,000. After five years the mortgage would have been reduced to \$2,025,000, and the interest payments to \$91,125, i.e., a saving of \$8,100 or almost \$16 per dwelling. The rentals could thus be reduced from year to year or at least after a certain number of years. A continuous rent reduction seems necessary, since the buildings become older and the apartments less attractive. This type of amortization means higher payments in the beginning, but a lasting benefit for the tenant-owners, the corporation, and the mortgagee in future years. Relatively low rentals after occupancy and decreasing rentals in later years are the best protection for the mortgagee and make unnecessary insurance and the premium of $\frac{1}{2}$ of 1% annually.

Finally, it may be interesting to note that President Roosevelt has already mentioned in a press conference¹ the possibility of working out some system on the building and loan association principle which will provide for a savings opportunity and at the same time furnish financing funds for construction of houses for rent.

JULIUS FLEISCHMANN

*Doctor of Political Economy,
University of Freiburg*

¹ See *Architectural Forum*, August, 1937, p. 2.

The New Housing Act

ON SEPTEMBER 1 the President's signature transformed the Wagner-Steagall Bill into the United States Housing Act of 1937.¹ Unquestionably this law is one of the most important pieces of housing legislation enacted in this country. For the first time the Federal Government has outlined a long-term program and established a continuing agency for improvement of low-rent housing, thus giving it at last the national status granted years ago to middle-class housing, home ownership, etc. Although evaluation of the Act must wait upon accumulation of some experience under its operation, some appraisal may be attempted

after an examination of its more important provisions.

Provisions of the Act

Objective. The purpose of the Act is to give federal financial aid to state and local housing authorities providing decent housing for families.

"who are in the lowest income group and who cannot afford to pay enough to cause private enterprise in their locality or metropolitan area to build an adequate supply of decent, safe and sanitary dwellings for their use."

Housing shall be made available through the Authority only to families whose net income is less than five times the rental, including

¹ Public No. 412, 75th Cong., 1st sess.

heat, light, water and cooking fuel; for families with three or more minor dependents, the limit is six times rental.

Administration. The Act created the United States Housing Authority in the Department of the Interior, under the general supervision of the Secretary. The Authority is a body corporate of perpetual duration and its powers are exercised by an Administrator appointed by the President with the consent of the Senate.²

Employees of the Authority receiving less than \$1,980 per year are to be appointed under civil service laws. All others are to be appointed by the Administrator without regard to civil service. Appointees receiving more than \$7,500 per year must be confirmed by the Senate.

Financing of the Authority. An appropriation of \$26,000,000 was authorized for the fiscal year ending June 30, 1938. Of this amount \$1,000,000 (which was included in the last Deficiency Appropriation Bill) is for capital stock of the Authority.

The Authority may issue obligations guaranteed by the United States both as to interest and principal in amounts not to exceed \$100,000,000 on or after the date of enactment, an additional \$200,000,000 on or after July 1, 1938, and still another \$200,000,000 on or after July 1, 1939. Maturity of these obligations may not exceed 60 years and the rate of interest shall not be more than 4%. Proceeds of the bond issue are not available for subsidies, and not more than 10% of the Authority's funds for loans, capital grants, or annual contributions may be expended in any one state.

Loans. Loans may be made to local and state housing authorities for the development, acquisition, or administration of low-rent housing or slum-clearance projects. If capital grants or annual contributions are also made, the Authority's loan may not exceed 90% of the development or acquisition cost. By implication the Authority's loans may be 100% of cost if not accompanied by grants or annual contributions. Term of loans may not exceed 60 years and the interest rate may not be less than the going federal rate at the time the loan is made, plus $\frac{1}{2}$ of 1%. The character of the

security is left to the discretion of the Authority.

Annual Contributions. Annual grants are authorized to supplement rents collected by local authorities. The contributions are to be limited by the Authority to the amount and period necessary to assure the low-rent character of the development. Under no circumstances may the annual contribution exceed the yield at the federal going rate plus 1% upon development or acquisition cost.

The term of the annual contributions may not exceed 60 years. If it is greater than 20 years, the Authority shall reserve the right to re-examine and, if necessary, to readjust amounts at the end of 10 years and every five years thereafter. Subject to this provision, annual contributions must be in fixed and uniform amounts. The Authority's power to enter into contracts for annual contributions is limited to \$20,000,000 over a period of substantially three years.

Capital Grants. Upon request of a local housing agency approved by the United States Authority a rather involved system of capital grants may be substituted for annual contributions to assure low rents. The Authority's capital grant may not exceed 25% of the project's cost. In addition, the President may allocate to the Authority from unemployment relief funds an additional grant to be expended for labor on the development. This additional grant may not exceed 15% of cost. No federal capital grant may be made unless the state or local governments make a grant of 20%. This local grant may be in the form of cash, land, or the capitalized value of community facilities, tax remissions, or tax exemptions. Federal capital grants are limited to \$30,000,000 during a period of substantially three years.

Local Annual Contributions. The Authority may make no annual contributions to supplement rents unless the state or local governments shall contribute "in the form of cash or tax remissions, general or special, or tax exemptions, at least 20 per centum of the annual contributions herein provided."

Existing Projects. The President may transfer to the Authority any right or title held by an agency of the Federal Government in any housing or slum-clearance project. He may also transfer any of the assets, records, libraries, materials, and any unexpended balances of funds allocated to

² The term of the Administrator is five years and his salary \$10,000 per year. He may be removed from office by the President for neglect of duty or malfeasance.

such agencies for housing or slum-clearance activities, or any employees engaged in such work. Subject to the provisions of this Act, the Authority may continue any or all activities undertaken in connection with projects so transferred.

Projects transferred or acquired by the Authority shall be sold or leased "as soon as practicable." Sale may be only to state or local housing authorities. After sale a project shall be eligible for loans, grants, or annual contributions. Sale price shall be not less than a fair value of the project for low-rent housing purposes less depreciation.

Low Rents. The Authority has broad powers to assure the low-rent character of projects financed by it. These include the right, upon substantial breach of agreement to maintain low rents, to raise the interest rate on loans, or to declare the unpaid principal due at once, or to terminate annual contributions.

Furthermore, the Authority is under a triple limitation on construction costs: (a) projects may "not be of elaborate or expensive design or materials"; (b) the average construction cost per dwelling unit in any project may not exceed the average cost of units privately produced in the same locality under building laws applicable to the housing project and under similar labor standards; (c) in addition, in cities under 500,000 population construction cost may not exceed \$4,000 per dwelling unit or \$1,000 per room. In larger cities the figures are \$5,000 per family unit and \$1,250 per room. These cost figures exclude land, demolition costs, and non-dwelling facilities, which are site development, improvements and facilities located outside building walls, e.g., sidewalks, utilities, roads, etc.

Slum Clearance. Projects subsidized by the Authority must include the demolition and effective closing or the compulsory repair and improvement of unsafe and insanitary dwellings substantially equal in number to the units to be constructed. The Authority, however, may defer this elimination of unfit buildings under conditions of shortage "so acute as to force dangerous overcrowding of such families."

Labor Standards. Labor employed on projects assisted by the Authority is assured prevailing wages and standard working conditions.

Omissions. The Act makes no provision

for demonstration projects, for loans to limited-dividend or cooperative housing organizations, for a statutory advisory committee to the Administrator, nor for members of the Authority in addition to the Administrator. Finally, the Act sets forth no standards emphasizing the relation of projects to existing or planned city growth.

Will It Work?

Although some important sections are open to different interpretations, my answer to this question is "Yes." Like the reports of Mark Twain's death, the rumors of the assassination or mutilation of the housing bill have been greatly exaggerated. Some of this exaggeration has come from detractors of the Administration; some of it from enthusiastic and well-intentioned housers, whose ideas of what the bill ought to be are considerably clearer than their understanding of what actually has been provided. Many of the statements have been unfair to the sponsors of the bill and unless counteracted at once may do much harm. Several points which have been heralded as ruining the bill or which actually do present substantial difficulties may be noted briefly.

Local Contributions. Perhaps the most dangerous provision in the House draft was the limit of federal loans to 85% of the development cost of subsidized projects. This plus the provision that federal loans had to be on first mortgage security practically meant that local communities would have to make a 15% capital contribution in cash or land. This would have stopped housing in many, probably in most, cities. The final draft increases the allowable federal loan to 90% and permits the Authority to take less than a first lien. Thus a well-run local authority should be able to borrow the 10% either from city funds or private sources.

Annual Contributions. The requirement of a 20% annual contribution by state or local governments in the final draft is ambiguously worded but, since it includes tax remissions or exemptions, it should not be unduly burdensome on most localities, particularly the larger ones. Recognition of the principle of local contributions ought to make for greater local interest and responsibility, as well as less strict regulation on some points by the federal agency.

Cost Limitations. The flat-cost limits un-

doubtedly are bad. They should not prohibit building, however, and in so far as they add to the forces emphasizing the reduction of capital costs, they are not an unmixed evil.

Civil Service. The civil service provisions are a messy compromise that will satisfy no one. Exempting from civil service all the important jobs in the Authority seems particularly unfortunate, both because (a) exceptionally able and skilled people are needed to administer a measure of this complexity, and (b) with the reduction in personnel of many Washington agencies under way, the pressure on Congressmen to relocate their friends and constituents is particularly strong.

Slum Clearance. The requirement of slum clearance equal to new construction seems to me to be unnecessary and indefensible in principle. It seems unnecessary because the emotional satisfaction from slum clearance will always assure this kind of project. (The danger rather is that too much slum clearance undertaken too quickly will bolster unjustified land values and result in poorly located projects.) It seems indefensible in principle because it must be based on the

erroneous assumption that the number of low-income families will not increase in the future.

Also the section is not clearly phrased, because the requirement is that "the project" must include demolition, etc.; whereas the arguments of its proponents seemed to imply that all they wanted was an equal amount of demolition in a locality, whether done by the authority or by some other agency. Suppose, for example, that a city building department, possibly encouraged and helped by a local authority, were to tear down 700 unfit buildings during a year. Could such demolition be counted as part of a local authority's project for which financial aid might be sought from the United States Authority?

The provision deferring application of this requirement in times of shortage, however, will take off much of the curse until further consideration will result in a more reasonable provision.

COLEMAN WOODBURY

*Director, National Association
of Housing Officials*

Land Resources Department

GEORGE S. WEHRWEIN, *Editor*

The Farm Tenancy Act

ONE of the important pieces of legislation enacted during the last Congressional session was the Bankhead-Jones Farm Tenant Act.¹ The purpose of the Act is to "promote more secure occupancy of farms and farm homes, to correct the economic instability resulting from some present forms of farm tenancy. . . ." To carry out these purposes the Farmers' Home Corporation is created and a very considerable portion of the Act (Title IV) is devoted to the organization and operation of that Corporation. Two other sections have to do with Rehabilitation Loans (Title II) and the Retirement of Submarginal Land (Title III).

Of immediate interest, however, is Title I containing the Farm Tenant Provisions. It is still too soon to judge the effectiveness of the legislation; much will depend upon the way in which it is administered. But it is worth while to review the farm tenancy provisions and the announcements that have been made to date concerning the use of appropriations already voted.

Under the new law the Secretary of Agriculture is authorized to make loans to aid people in acquiring farms. Persons eligible for such aid are limited to those who are now or have recently been obtaining the major portion of their income from farming. Other limitations on eligibility are found in the preference for married persons, persons with dependent families, persons able to make an initial down payment, or persons having stock and equipment necessary for farming operations. Loans may also be made only on farms which are units of economic size.

To assist the Secretary to carry out these stipulations regarding farm loans, he is authorized to appoint county committees (§42) which shall examine the applicants and also examine and appraise the farms on which loans are sought.

After certification of both applicant and farm a loan may be made, sufficient to permit acquisition of the farm and to make necessary repairs, but not in excess of the value of the farm as certified by the County Committee.

Security for the loan shall be a first mortgage or deed of trust. The loan together with interest at 3% shall be amortized within a period not to exceed 40 years, according to schedules prepared by the Secretary. Other conditions to protect the security and to insure maintenance and economic operation of the farm may be prescribed by the Secretary. The penalty for violation of any of these conditions shall be demand for immediate payment of the unpaid balance of the loan.

The remaining sections of Title I provide (1) for the equitable distribution of the annual appropriations under the Act "among the several States and Territories on the basis of farm population and prevalence of tenancy, as determined by the Secretary"; (2) for avoidance of production expansion in conflict with the Soil Conservation and Domestic Allotment Act; and (3) for appropriations not to exceed \$10,000,000 for the fiscal year ending June 30, 1938, not to exceed \$25,000,000 for the fiscal year ending June 30, 1939, and not to exceed \$50,000,000 for each fiscal year thereafter.

A good deal of interest attaches to how these appropriations will be used; to the manner of their apportionment among the states; and whether for demonstration purposes or for direct loans. A release from the Department of Agriculture dated October 8, 1937 announces that \$9,500,000 of the \$10,000,000² for the current year will be made available for loans in about 300 counties. The specific counties in which loans will be made will be determined by the Secretary upon recommendation from the Farm Security Advisory Committees in the several states. Furthermore, "the number of loans per county shall not be less than five nor more than ten, except in states in which the total number of loans shall be less than five."

This same release also shows the allotment of the \$9,500,000 for 1937-38 among the 48 states, three territories, and the District of Columbia. The distribution has apparently been made on the basis of farm population and the prevalence of tenancy, as stipulated

¹ Public, No. 210, 75th Cong., 1st sess.

² The remaining \$500,000 of this year's appropriation has been set aside for administrative expenses.

in the Act. It is interesting to note that almost 70% (\$6,600,532 or 69.4%) of the total appropriation has been allotted to the major grain- and cotton-growing states. The eight leading cotton states have been assigned \$4,606,385 or an average of \$575,798 each, while the eight major grain- (mostly corn) producing states have been assigned \$1,994,147 or an average of \$249,268 each.

Many questions will arise which will have

to wait upon further announcement of administrative policies and the accumulation of some experience under operation of the Act. The *Journal* proposes to follow the subject closely and a future issue will carry analysis of the Act in relation to special problems of tenancy in the Corn Belt and in the Cotton Belt.

HELEN C. MONCHOW

Of the Journal Staff.

Rural Zoning Legislation in Tennessee

ZONING outside the limits of the incorporated area of cities in Tennessee was first authorized by the Legislature in 1931. A private act¹ conferred upon the City Council of Memphis and the Shelby County Quarterly Court the authority to zone, by joint action, the area within five miles of but outside the corporate limits of the city of Memphis. Another act² was passed in 1935 extending the zoning authority of the Quarterly County Court to the entire unincorporated area of Shelby County. These acts were designed primarily to provide for planned and regulated development within the expanding metropolitan area of Memphis. Considerable progress has been made in the preparation of zoning plans for Shelby County.

State Planning Legislation

The activities of the Tennessee Valley Authority, established in 1933, have been responsible for a marked stimulation of interest in planning and zoning in Tennessee. The Tennessee Valley Commission³ was created by a resolution of the Tennessee Legislature to represent the State in all matters pertaining to development of the Tennessee Valley, and to cooperate with the Federal Government. This Commission supported a number of bills, 11 of which were passed during the 1935 session of the Legislature, designed primarily to promote closer cooperation with the TVA. Five of these bills dealt primarily with conditions immediately affecting the work of the TVA, such as facilitating acquisition by cities and counties of electric distribution plants for TVA power, and the others were enabling acts designed

to give the State, its counties, cities, and towns the benefit of the planning board activities of the Federal Government, both through the work of the TVA as well as through other means.

The legislation providing for the creation and establishment of the Tennessee State Planning Commission and for regional planning commissions has been discussed in a previous issue of this *Journal*.⁴ Under the terms of this legislation the State Planning Commission has set up and defined the boundaries of four planning regions and established regional planning commissions therefor. One of the regions embraces an area within five miles of the corporate limits of Nashville; each of two other regions consists of an entire county—Hamilton and Shelby counties in which are located the cities of Chattanooga and Memphis, respectively; one region consists of the five counties in the extreme northeastern corner of the State. Since the Planning Commission has had neither money nor facilities for comprehensive planning covering the entire State, it has settled on these four regions which it considers ideally adapted for localized planning purposes. This approach provides for much-needed experimentation in regional planning before attempting to cover the larger area. It is expected that the plans devised by these regional commissions will be incorporated into a general state-wide plan by the State Planning Commission.

State-Wide Zoning Enabling Legislation

The 1935 session of the Legislature passed a rural zoning enabling act⁵ empowering the quarterly county court of any county

¹ Private Acts 1931, c. 613.

² Private Acts 1935, c. 625.

³ Later (April, 1934) designated by the Governor as the Tennessee State Planning Board.

⁴ See Baker, J. A., "The Tennessee State Planning Commission," 12 *Journal of Land & Public Utility Economics* 315-316 (August, 1936).

⁵ Public Acts 1935, c. 33.

"to regulate by districts or zones, in portions of such county lying outside of municipal corporations, the location, height and size of buildings and other structures, the percentage of lots that may be occupied, the sizes of yards, courts and other open spaces, the density and distribution of population, the location and uses of buildings and structures for trade, industry, residence, recreation or other purposes and the uses of land for trade, industry, residence, recreation, agriculture, forestry, soil conservation, water supply conservation and other purposes."

This act contained the provisions necessary to fulfill the requirements of adequate rural zoning enabling legislation, except that two provisions were inserted near the end of the act almost completely invalidating its usefulness for rural zoning. These provisions, clearly not in line with the general intent of the act and obviously inserted to prevent adoption of the types of regulations for which the act was primarily designed, were: (1) "Nor shall this Act be construed as limiting or affecting in any way or controlling the agricultural uses of land," and (2) "Provided, nothing in this Act shall be construed to in any way control or interfere with the use by any person of his own property or the renting of same."

Passage of the zoning enabling act, in spite of its limitations, has stimulated further interest in zoning and zoning legislation. The Nashville Regional Planning Commission has made some progress in the preparation of zoning plans. The Hamilton County Regional Planning Commission has already given final approval to its county zoning plan and recommended it to the County Court for adoption under the authority granted by the 1935 zoning enabling act. Although this act is too strictly limited in its authorization to cover the types of regulations and restrictions desired by the Hamilton County Commission and citizens, it is hoped that public opinion, already enlightened through numerous educational meetings, will prove to be effective in obtaining adherence to the zoning regulations. Recently it was reported that a property owner was planning "to erect a store on one of Lookout Mountain's most beautiful scenic drives, much to the consternation of Mountain residents, who, not wanting their drive spoiled or their properties jeopardized, have protested vigorously to the commissioners of the township. They likely will stop him by

enforcing a little private zoning ordinance of their own, or by plain boycott."⁶ It is doubtful whether the zoning ordinance can be successfully enforced by public opinion alone; however, the effort to do so may prove an effective method of obtaining wider support for enactment of additional zoning enabling legislation. Attempts were made during the 1937 session of the Legislature to obtain passage of private acts granting more adequate zoning authority to the County Courts of Davidson (in which the Nashville planning region is located) and Hamilton counties. These attempts failed because of opposition on the part of interests which feared they would be adversely affected by zoning ordinances.

Private Acts Authorizing Zoning

The Northeastern Tennessee Regional Planning Commission was more successful in obtaining passage of zoning enabling legislation which it sponsored during the 1937 legislative session. With the widespread support of local citizens and members of the Regional Commission, private acts authorizing the quarterly county courts to adopt zoning ordinances were passed for each of the five counties⁷ in the Northeastern Region. These acts contained the same grant of power to the quarterly county courts as the 1935 zoning enabling act, quoted above. However, the five private acts of 1937 contained no provisions preventing the regulation of private property or agricultural uses of land, as did the earlier act. They clearly make adequate provision for both suburban zoning, applicable to territory adjacent to cities or in other intensively developed areas, and for strictly rural zoning.

The regional planning commission is designated as the agency to make and to certify to the county court a zoning plan, including both the text of a zoning resolution and zoning maps, representing the recommendations of such planning commission for regulation by districts or zones of the subjects set forth in the grant of power. After certification of a zone plan from the regional planning commission, the county court must hold a public hearing thereon before enactment of the zoning resolution. The county court can make no change in or departure

⁶ Tennessee State Planning Commission, "Plan Topics," Vol. II, No. 5, p. 11 (May, 1937).

⁷ Private Acts 1937, c's. 901 (Washington), 902 (Unicoi), 903 (Carter), 904 (Johnson), and 520 (Sullivan).

from the text or maps as certified by the regional planning commission unless such change or departure be first approved by the planning commission, except by a favorable vote of a majority of the entire membership of the county court. Provision is made for amending the zoning map or resolution in the same manner as is followed in adopting the original resolution.

Any county court which enacts zoning regulations must create a county board of zoning appeals of three or five members to

"in appropriate cases and subject to appropriate principles, standards, rules, conditions, and safeguards set forth in the resolution, make special exceptions to the terms of the zoning regulations in harmony with their general purpose and intent. The county court may also authorize the board of appeals to interpret the zoning maps and pass upon disputed questions of lot lines or district boundary lines or similar questions as they arise in the administration of the zoning regulations."

The county court may provide for enforcement of its zoning regulations by withholding building permits and, for such purpose, may establish and fill a position of county building commissioner. After the filling of such position,

"it shall be unlawful to erect, construct, reconstruct, alter or use any building or other structure without obtaining a building permit from such county building commissioner, and such building commissioner shall not issue any permit unless the plans of and for the proposed erection, construction, reconstruction, alteration or use fully conform to all zoning regulations then in effect."

These provisions should be of great help in facilitating effective administration and enforcement of zoning resolutions; but they may also form the basis for opposition to the adoption of zoning resolutions, particularly in strictly rural areas. Rural people may be extremely skeptical about the types of building regulations contemplated.

The county zoning acts contain no provisions relative to the continuation of established non-conforming uses or the preparation of a record of non-conforming uses exist-

⁸ Tennessee State Planning Commission "Planning in Tennessee," Bulletin No. 7, May, 1937.

ing at the time of enactment of the zoning resolution.

Land classification is now being undertaken by the Northeastern Tennessee Regional Planning Commission preparatory to the drafting of zoning plans for the five counties. Numerous printed statements issued by the State Planning Commission indicate that emphasis is not being placed on comprehensive zoning of the strictly rural type as practiced in Wisconsin, but rather on zoning around cities, airports, highways, and recreational areas. According to a State Planning Commission report,

"four things have been stressed by the Northeastern Tennessee Regional Planning Commission: maintaining and attracting permanent industrial plants; integrating and modernizing the region's highway system; eliminating hazardous and time-wasting crossings; and providing for recreational areas at a convenient distance to the region's greatest population centers. Up to now land classification has occupied a secondary place in planning activities."⁸

Conclusions

Now that adequate rural zoning legislation has been enacted for five counties, it is expected that more emphasis will be placed on strictly rural planning and zoning for agriculture, forestry, recreation, and soil and water conservation. Although the existing legislation places little emphasis on participation of local people in the development of zoning plans, the Planning Commission contemplates a thorough educational program through discussion group meetings and public hearings before submitting final plans to the county courts. Through this procedure it is hoped that demonstration of the feasibility of zoning as a desirable land-use measure may result both in the adoption of more comprehensive regulations in the counties now having authority to zone, and in the enactment of zoning enabling legislation for other counties in the State.

JAMES H. MARSHALL

*Associate Agricultural Economist,
Farm Security Administration,
United States Department of Agriculture*

Control of Wind Erosion

THE Kansas Soil Drifting Law mentioned in the August, 1936 issue of this *Journal*¹ was declared unconstitutional during 1936 by the Kansas Supreme Court, which held that the act gave legislative power to the county commissioners who were

authorized to "provide funds" to carry out the purposes of the act.

¹ See Wehrwein, George S., "Wind Erosion Legislation in Texas and Kansas," 12 *Journal of Land & Public Utility Economics* 312-3.

A new act² which was passed during the 1937 session of the Kansas Legislature declared it to be the duty of the owner of real property to prevent dust blowing therefrom by planting perennial grasses, shrubs, or trees, annual or biennial crops, or by cultivation. To carry out and make effective the purposes of the act, the secretary of the state board of agriculture is authorized to collect data on soil erosion, dust storms, and practical methods of prevention and to furnish such information to county commissioners and others.

The county commissioners are authorized and directed to inspect land known to be blowing and, if injury is being done to nearby fields, to determine control methods to be used. Authorization is also given to enter upon such land and do such work, or employ persons to do such work, as may be necessary to control soil erosion and dust blowing. The cost of such work may be charged to the owner of the land, providing the owner fails to act after "reasonable" notice has been given to him. The cost for such work, not in excess of one dollar per acre per year, shall be assessed against such land, after hearing, and collected as are other taxes.

An annual survey shall be made by the county commissioners to determine the extent of wind erosion. The county commissioners shall consider control methods of a permanent nature which may be applied upon repeatedly blowing fields. After a

hearing, such control measures may be ordered to be applied.

A "soil drifting fund" is authorized and created by levying a tax, not to exceed one mill on a dollar, on all real property and tangible personal property.

The secretary of the state board of agriculture has been made the agent of the state for the purpose of entering into any agreement with the Federal Government, or any agency thereof, for cooperation in efforts to prevent soil erosion by wind and dust storms produced thereby, and he is authorized to accept any money disbursed for that purpose by the Federal Government, or any of its agencies, and to distribute such money among the counties.

Since the "soil drifting fund," as provided by this act, will not be available until January 1, 1938, there has been very little activity under this law during 1937. A few counties, however, are tilling a moderate acreage and will charge the cost to the owner of the land.

The Kansas Legislature also passed the model soil conservancy district law. The state committee has approved petitions asking for soil conservation districts to be organized in 11 counties located in the southwest corner of the State where the wind erosion problem is greatest. Referenda are now being called in these counties.

E. H. TEAGARDEN

*District Agent,
Extension Service,
Kansas State College*

² Laws 1937, c. 189.

Public Utilities Department

E. W. MOREHOUSE, *Editor*

The "Used and Useful" Doctrine Applied to Land

IT IS a well established principle of rate-making that the property included in the rate-base of a public utility should be restricted to what is used and useful in furnishing utility service. But in the application of this principle courts and commissions are wont to exercise a wide discretion, influenced by various factors—including subconscious predilections of the tribunal. The general practice, for a long period, seems to have been lenient rather than rigorous; and utility companies have generally sought a very broad interpretation of the principle, including a perversion of the phrase "used and useful" into "used or useful," which is inclusive rather than restrictive in scope.

As to the structural property—plant and equipment, exclusive of land—little attempt has been made to apply the principle of "used and useful" with the utmost strictness. Buildings, machinery, distribution systems, etc., included in the rate-base, have not been narrowed down to the items, or portions of them, which are literally and currently used; a reasonable provision for expanding use is common, and is consistent with the principle of fairness, provided that consideration be given not only to the question of what the utility has actually built, prudently and in good faith, but also to the further question of burdening a present number of consumers with a plant designed for a degree of use much greater than now exists.

The question of fairness is complicated by the degree to which the valuation basis injects the element of speculative profit or loss on the part of stockholders. With structural property such speculation may be considerable, if reproduction cost is taken as the major element of value, rather than actual investment; but that is a matter of widely varying treatment. As to land, on the other hand, whether wisely or not, the almost universal treatment is to include it in the rate-base at present market values, and not at cost; and it is therefore fully subject to the speculative influences that affect land values. These influences, furthermore, are fundamentally different from the speculative elements that affect structural values, particu-

larly as to the degree of community influence; and in a growing community they produce a generally increasing tendency in land values, whereas structural values based on reproduction fluctuate widely, up or down, with changing prices, improved equipment or construction methods, obsolescence, etc. A different attitude, therefore, as to unused property, seems justified in the case of land as contrasted with structural property.

A guide to the proper treatment may be had if we examine the argument, sometimes heard on the part of utility counsel, that if the utility is not permitted to include in the rate-base such land as it has purchased for future use, it will have no incentive to make such purchases at favorable times and prices; and it is even claimed that both the utility and the consumer would suffer if such permission is not granted. This concern for the consumer becomes ludicrous, however, when we consider that when the use for the land develops he is to be charged with a return on the full value of the land at that time and not on the lower price at which it had been presumably acquired; and an increase in price from time of acquisition to time of use is assumed, as there would otherwise be little if any reason for the early purchase. The utility's position that the land be included in the rate-base *before* its actual use means that the consumer would be expected to pay a return on constantly, or at least generally, increasing values, thus giving the utility increasing speculative profits during the period of non-use, as well as after use begins.

There is some possibility that if a utility waits to purchase land, as, for example, to expand a plant site, until the land is actually needed, it would have to pay an excessive price, in the nature of a hold-up, and if that price were included in the rate-base—a matter of dubious propriety—the consumer would suffer; but whether this would offset the alternative burden of carrying the land from the date of an early purchase is extremely doubtful. Moreover, in the case of land purchased in large tracts, where parts remain unused for a period of time, it is by no means unknown for a utility to claim an

added element of present value attributable to assembly, which is akin to the concept of hold-up prices.

Under the prevailing practice of allowing full market value of land there is plenty of incentive to a utility to purchase land at favorable prices in advance of actual use, without including such land in the rate-base; for it obtains, or expects to obtain, the full benefit of an increase in land value, at the time of putting the land to use and including it in the rate-base. At the same time a check is placed upon unwise investments in land which may not be needed for a long time, if ever, as well as upon any tendency toward more questionable land speculation at the consumer's expense.

If the utilities sought only a return on the actual investment in land, they could properly ask to have the consumer pay such a return on the actual cost of land acquired in advance of actual use, if the purchase was prudently made. But as long as they demand and receive a return on the full current market value of land actually in use, they stand to profit by the increase in value of land purchased in anticipation of future use, and the rule that a utility is entitled to a return only on used and useful property should be fully and strictly applied in the case of land.

H. M. OLMSTED

*Consulting Engineer,
Illinois Commerce Commission.*

Public Utility Financing in the Third Quarter of 1937

ALTHOUGH the third quarter is frequently a comparatively dull period as regards distribution of securities, the slump in public utility financing which occurred during the period under review undoubtedly is attributable in large measure to the severe decline of prices in the organized securities markets, particularly speculative issues, which began in August. Only two public utility issues, aggregating \$11,500,000, were brought out during September. Volume was moderate in August but rather low in July. The third quarter total of \$90,901,000 represented a decline of 58.2% from the second quarter of this year and a decline of 71.1% from the third quarter of 1936. Although the total volume was the smallest since the first quarter of 1935, the volume of new capital was the largest, except for the last quarter of 1936, since the third quarter of 1932.

Perhaps the outstanding feature of public utility financing during the third quarter of 1937 was the fact that \$43,486,827, or 47.8% of the total volume, was classified as new capital. In the second quarter of this year new capital represented \$34,006,282, or 15.6% of the total volume. The quarterly volume of new capital financing during 1935 and 1936 and the first half of 1937 ranged from \$500,000 to \$40,500,000, except for a total of about \$49,500,000 in the last quarter of 1936. The ratio of new capital to total financing during 1935, 1936, and the first quarter of 1937 ranged from 4% to 7%. In view of the restricted volume during the quarter under review, it still cannot be de-

termined whether utility financing has definitely turned away from a preponderance of refunding operations and will represent in larger measure the acquisition of fresh capital in the future.

Public utility financing in the third quarter was characterized by the comparatively small size of the issues and by the frequency of private distribution. The 17 issues making up the quarter's total ranged from \$100,000 to \$28,900,000, with a median of \$1,000,000 and an average of \$5,347,000. Both of these measures are considerably below those for earlier periods reviewed.¹ Seven of the issues, totaling \$19,151,000, were sold privately to institutional investors, and one issue of \$100,000 was offered directly to stockholders. Public offerings were therefore made in only nine instances, but these issues accounted for \$71,650,000, or 78.7% of the total volume for the period.

Of the 17 issues recorded for the third quarter, four were stocks, two were short-term debts, and 11 were long-term debts. Both of the short-term obligations bore serial maturities and were placed privately; one of the long-term debt issues was scheduled to mature serially.

Long-Term Debt Financing. Eleven long-term debt issues were floated for an aggregate of \$70,901,000. Of these issues, four which were sold privately are listed in Table I. The serial issue consisted of \$1,600,000 Serial Notes of the Ohio Public Service

¹ See references cited in footnote 2, *infra*.

TABLE I. SUMMARY OF LONG-TERM DEBT ISSUES PLACED PRIVATELY, THIRD QUARTER, 1937

Company and Issue	Principal Amount	Coupon Rate	Maturity Date	Month of Sale	Price
Iowa Public Service Co. First Mortgage	\$1,000,000	5%	1967	July	100.00
Inter-State Water Co. First Mortgage	875,000	4½	1952	August	100.00
The Kansas Electric Power Co. First Mortgage, Series A	500,000	3½	1966	July	91.375
The Kansas Power Co. First Mortgage, Series A	376,000	5	1947	August	100.00
Total	\$2,751,000				

Company, maturing in equal annual amounts on August 1, 1938 to 1947, inclusive; coupon rates ranged from 3% to 4%; and the notes were offered at an average price of 101.558 (average of all maturities).

Six long-term debt issues which were offered publicly are analyzed in Table II. In view of the less favorable market conditions during the third quarter of 1937, it is pertinent to inquire how the weighted averages for coupon rate, offering yield, cost of money, underwriters' commissions, and incidental expenses for the present quarter compare with the corresponding quarterly averages during 1936 and the first half of 1937. The answer is supplied by the tabulation below which shows the range of the quarterly averages for the six quarters prior to the period under review in comparison with the averages shown in Table II for the

third quarter of 1937:

Item	Range, 1936 and First Half of 1937	Third Quarter 1937
Coupon rate	3.48% to 3.82%	3.81%
Offering yield	3.37 to 3.78	3.69
Cost of money	3.51 to 4.00	3.86
Underwriters' commissions	2.02 to 2.26	2.02
Incidental expenses	0.54 to 0.91	0.84

The tabulation reveals that the present quarter's averages fall within the ranges shown. It is interesting to note that in the case of underwriters' commissions the present average is as low as any found during the past two years.

Other Financing. The two short-term debt issues consisted of (1) \$6,000,000 of Lone Star Gas Corporation 2% to 4½% notes

TABLE II. SUMMARY AND ANALYSIS OF LONG-TERM DEBT ISSUES OFFERED PUBLICLY (EXCLUSIVE OF SERIAL MATURITIES), THIRD QUARTER, 1937

Company and Issue	Coupon Rate	Principal Amount	Maturity Date	Month of Offering	Offering Price*	Offering Yield	Underwriters' Commissions*	Proceeds to Company*	Estimated Incidental Expenses*	Net Proceeds*	Cost to Company†
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Ohio Public Service Co. First Mortgage	4	\$28,900,000	8-1-62	August	102½	3.84	1.99	100.64	0.67‡	99.96	4.00
Westchester Lighting Co. General Mortgage	3½	25,000,000	7-1-67	July	102.50	3.37	2.00	100.50	1.02	99.48	3.53
Ohio Edison Company First Mortgage	4	8,500,000	9-1-67	September	100.50	3.97	2.25	98.25	0.51	97.74	4.13
Rochester Gas & Elec. Corp. General Mortgage, Series H	3½	3,000,000	9-1-67	September	102.75	3.60	2.00	100.75	1.15	99.60	3.77
Macon Gas Co. First Mortgage	4½	750,000	6-1-52	July	92.00	5.28	—	92.00	2.48	89.52	5.54
National Gas & Elec. Corp. 1st Lien Coll. Trust, Series B	5	400,000	6-1-47	August	98.50	5.20	4.00	94.50	3.60‡	90.81	6.25
Weighted Averages	3.82				102.17	3.69	2.02	100.15	0.84	99.31	3.86
Totals§											

* Expressed as a percentage of the principal amount shown in Column (C).

† Computed on a bond yield basis using net proceeds per Column (K).

‡ Pro rata share of total expenses on two or more issues by the same company.

§ Totals which represent summation of actual amounts are: Principal Amount, \$66,550,000; Offering Price, \$67,992,625; Underwriters' Commissions, \$1,341,782; Proceeds to Company, \$66,650,843; Estimated Incidental Expenses, \$562,254; Net Proceeds, \$66,088,589.

maturing semi-annually to August 1, 1942, and (2) \$10,000,000 of 1 $\frac{3}{4}$ % to 4% notes of the same Corporation maturing on the same dates. In both instances the notes were taken directly by groups of banks.

The four stock issues were: (1) 4,000 shares (\$100,000) of Naugatuck Water Company capital stock offered to stockholders at \$25 per share in August; (2) 8,000 shares (\$400,000) of New Mexico Gas Company 6% cumulative convertible preferred, \$50 par value, offered at \$45 per share in August; (3) 16,000 shares (\$1,600,000) of Ohio Public Service Company 5 $\frac{1}{2}$ % cumulative first preferred stock, \$100 par value, offered at \$92.50 per share in August; and (4) 20,000 shares (\$1,900,000) of Washington Gas Light Company \$4.50 cumulative convertible preferred stock, no par, offered at \$95.00 per share under a prospectus dated June 23, 1937, but reported in July's compilations. Net proceeds after commissions and expenses were \$87.83 per share on the Ohio company's issue and \$90.76 per share on the Washing-

ton company's issue. The net cost was thus 6.26% and 4.96%, respectively. The New Mexico Gas Company issue did not represent new financing and none of the proceeds was received by the Company.

Index Number of Volume

The index numbers² of volume of public utility financing for the third quarter of 1937 are as follows:

Period*	Total Capital	New Capital	Refunding Capital
July	17.78	21.55	1.45
August	30.64	2.47	152.30
September	7.01	8.64	nil
Third Quarter	18.48	10.89	51.25

* The bases for these index numbers are as follows: monthly average, 1926 equals 100 for the monthly series; quarterly average, 1926 equals 100 for the quarterly series; and the year's total for 1926 equals 100 for the annual series.

E. D. OSTRANDER

Supervisor, Section of Rates and Research,
Illinois Commerce Commission

² For a description of the index and back figures through 1919 see "The Volume of Public Utility Financing, 1919-1935," 11 *Journal of Land & Public Utility Economics* 352-356 (November, 1935); 12 *Ibid.* 91-94 (February, 1936); 12 *Ibid.* 208-210 (May, 1936);

12 *Ibid.* 320-323 (Aug., 1936); 12 *Ibid.* 431-433 (November, 1936); 13 *Ibid.* 71-77 (February, 1937); 13 *Ibid.* 213-215 (May, 1937); and 13 *Ibid.* 320-322 (August, 1937).

Rural Electrification in Wisconsin in 1936

THE reports of Wisconsin public utilities to the Public Service Commission regarding rural lines constructed in 1936 have been summarized in Table I. This table shows data for each of the five companies which were most active in rural electrification, and for groups of other companies and municipal utilities.

It will be observed that over 2,000 miles of new rural line were built in 1936, serving about 6,000 new customers. (Not all of these were farmers, however.) This is an average of three customers per mile. Most of this construction was 2,300 to 6,900 volts, and practically all lines were single-phase. The weighted average construction cost per mile as reported was \$905, and per customer, \$305. Cost per mile among the five companies building the major share of the lines varied from \$758 to \$1,100. The three companies with lowest costs are affiliated, all being subsidiaries of the North American Company. The weighted average cost per mile reported by these three companies was \$806, and per customer, \$298. Weighted

average customers per mile were 2.7. These companies built over 60% of the total rural lines constructed in Wisconsin in 1936. The territory served is mainly in the relatively more densely populated part of the State—namely, the southeastern corner.

An interesting comparison may be made between the costs shown in Table I and a tabulation of costs per mile for REA rural lines which was recently published.¹ The median cost per mile for 86 projects was \$979, but this includes many cases with substantial amounts of multi-phase construction, and represents a greater average customer density than the Wisconsin public utilities' extensions. Taking only the projects with all single-phase lines and 3.5 or fewer customers per mile, costs in the REA tabulation varied from \$856 to \$925 per mile. Only three projects are covered by these specifications, however. There are 15 cases

¹ M. O. Swanson, "Construction Practices and Costs—REA Rural Lines," *Electrical World*, April 24, 1937, p. 60 (Vol. CVII, p. 1402).

TABLE I. WISCONSIN ELECTRIC UTILITIES, RURAL ELECTRIC LINE CONSTRUCTION IN 1936

	Miles Con- structed	Phase	Voltage	Custom- ers Con- nected	Cus- tomers per Mile	Invest- ment per Mile	Invest- ment per Customer
Wisconsin Gas and Electric Co.	903.0	1	4,800	2,258	2.5	\$ 804	\$322
Wisconsin Power and Light Co.	348.1	1†	6,900†	1,202	3.5	1,100	318
Wisconsin Public Service Corp.	191.4	1	6,900‡	635	3.3	1,087	328
The Milwaukee Elec. Railway & Lt. Co.	176.9	1	4,800	600	3.4	758	223
Wisconsin-Michigan Power Co.	188.7	1§	2,300§	574	3.0	856	281
Other private utilities*	142.7	—	—	501	3.5	1,078	307
Municipal utilities	78.0	—	—	248	3.2	886	279
Total	2,028.8	—	—	6,018	3.0	\$ 905	\$305

* Excluding one company for which costs were not available. This company built 69.6 miles of rural line.

† 54.4 miles were 2,300 volts, and .8 miles higher than 6,900 volts; .15 miles were 3-phase.

‡ 31.6 miles were 2,300 volts, and 2.5 miles higher than 6,900 volts.

§ 2.9 miles were higher than 2,300 volts, and .3 miles were 3-phase.

with less than 15% multi-phase lines to total, and 2.5 to 3.5 customers per mile. Cost per mile for this group ranged from \$720 to \$1,115, with the median at \$893.

It may be concluded that the costs achieved by the three Wisconsin subsidiaries of the North American Company average less per mile than comparable REA projects tabulated in the *Electrical World*. On the other hand, the other two Wisconsin private utilities listed separately in Table I have costs per mile above the REA average.

Parentetical mention has previously been made of the fact that the 6,000 customers added to new rural lines in 1936 do not all represent farms. These include many non-farm customers. On the other hand, this figure does not include rural customers added to existing lines during 1936.

With the present state of customer statistics it is possible to determine definitely only the number of "rural" customers, that is, those served at rural rates. These include many non-farm customers in rural territory, while as an offsetting item they exclude farms served at urban rates. At December 31, 1936 the total number of rural customers served in Wisconsin was 47,862, having been increased by 6,072 in 1936. During the first six months of 1937, 6,336 rural customers were added, exceeding the entire year 1936. These additions brought the total rural customers served by private and municipal public utilities to 54,198 at June 30, 1937. This does not include approximately 500

customers served by rural cooperatives at June 30, 1937, all added during 1937.

It is estimated that at June 30, 1937 the non-farm customers served at rural rates were approximately equal to the farms served at urban rates, so that the total number of rural customers may be taken as an approximate measure of the number of farms receiving electric service. On this basis, about 28% of the farms in Wisconsin with occupied dwellings were receiving electric service at June 30, 1937. It should not be concluded that the 72% of occupied farm dwellings not served are all potential customers. In some cases the density of farms is so low as to preclude the possibility of electric service without some form of subsidy. In other cases the cash income of the farmers is so small as to make the cost of electric service, without material decreases in present rates, almost prohibitive.

The situation just mentioned is illustrated by the reported figures on number of unserved potential customers located within 500 feet of existing lines at December 31, 1936. These premises within easy reach of the existing lines, but not taking service, averaged about 30% of the total rural customers served. In this same connection it is interesting to note that about 75% of the rural customers added in 1936 were connected to lines built during this year, while the remaining 25% were connected to lines built prior to 1936. The fact that a large number of customers were added to lines al-

ready built indicates that many farmers have had electric service available without previously taking advantage of their opportunity. It is to be expected that material numbers of these farmers will take electric service at some time in the future, but probably 100% saturation of customers along

rural lines will not be achieved for many years.

BARCLAY J. SICKLER

*Chief Statistician,
Public Service Commission
of Wisconsin*

State and Federal Regulation of Railroad Safety Devices

IN BOTH the railroad and public utility fields state regulation generally preceded federal regulation; gradually the Federal Government enacted legislation which in many instances replaced or superseded state laws.¹ This loss of state jurisdiction has been noteworthy in the case of railroads, and at present the power of the states over abandonment, rates, securities, and service has diminished to a mere shadow of its former importance. In the field of safety the Federal Government has virtually superseded the power of the states over safety appliances, hours of service, accident reports, and locomotive equipment, and to a lesser degree over safety devices.² At the last session of Congress certain legislation which tended to increase the power of the Federal Government over safety devices and thereby diminish, if not supplant, the power of the states in that field was enacted.³ The extent of this change will be discussed.

When the Federal Government legislates over a subject of interstate commerce which the states are occupying, two questions will determine whether federal action has superseded state action. (1) Is there an actual conflict in the legislation of both sovereign powers? (2) If so, has the time when Congress will act through a commission been deferred so that the state regulations are in effect until the federal authorities act? These will be discussed in the order named.

In *Napier v. Atlantic Coast Line*⁴ it was contended that state statutes relating to cab curtains and automatic doors to fire boxes of locomotives were not superseded by the Federal Locomotive Boiler Inspection Act. The Court denied this contention and stated

that the Federal Government had occupied the field of regulating locomotive equipment used on a highway of interstate commerce so as to preclude state regulation:

"The federal and state statutes are directed to the same subject—the equipment of locomotives. They operate upon the same object. . . . We hold that state legislation is precluded, because the Boiler Inspection Act, as we construe it, was intended to occupy the field. The broad scope of the authority conferred upon the commission leads to that conclusion. Because the standard set by the Commission must prevail, requirements by the states are precluded, however commendable or however different their purpose. . . .

"If the protection now afforded by the Commission's rules is deemed inadequate, application for relief must be made to it. The Commission's power is ample. Obviously, the rules to be prescribed for this purpose need not be uniform throughout the United States; or at all seasons, or for all classes of service." (272 U.S. 605 at 612-613.)

Section 26 of the Interstate Commerce Act formerly authorized the Commission to order installation of "automatic train-stop or train-control devices or other safety devices."⁵ Under the recent amendment to that section the Commission may order the installation of "the block signal system, interlocking, automatic train-stop, train-control, and/or cab-signal devices, and/or other similar appliances, methods and systems intended to promote the safety of railroad operation." In addition, subsection (b) of the amended section provides that the systems or devices in effect at the time of enactment or thereafter installed may not be discontinued or "materially modified" without consent of the Commission. The amendment provides in subsection (c) for early filing of

Interstate Commerce Commission (New York: Commonwealth Fund, 1931), p. 245.

³ Public No. 378, 75 Cong., 1st sess., approved Aug. 26, 1937. This amended Sec. 26 of the Interstate Commerce Act, 41 Stat. 456 (1920); 49 U.S.C. 26 (1934).

⁴ 272 U.S. 605 (1926).

⁵ See footnote 3.

¹ Biklé, "The Silence of Congress," 41 *Harvard Law Review* 200 (1927).

² The authorities are collected and discussed in Margolius, "The Interstate Commerce Commission and the Development of Safety Legislation," 5 *George Washington Law Review* 712, 737 (1937) and 1 Sharfman, *The*

the carriers' rules and standards and approval of these or any changes by the Commission. Where the carrier neglects to comply with the filing provisions, the Commission may prepare rules and standards for the carrier and the same will be binding on the railroad. Furthermore, ample power to revise rules and standards of the carrier is given to the Commission. Subsections (d) and (e) provide for inspection, repair, and proper maintenance. Reports of failure to operate and of accidents resulting from such failures are required; the Commission may investigate the facts concerning the accident. Broad powers of enforcement are conferred under subsections (g) and (h).

Viewing these provisions in the light of court decisions involving the question as to whether federal regulation had superseded state legislation on safety, it appears that the Federal Government has occupied the field to the exclusion of the states in the matter of block-signal systems, interlocking, automatic train-stop, train-control, or cab-signal devices.⁶ Use of the terms "and/or similar appliances, methods and systems intended to promote the safety of railroad operation" strengthens the argument that the Federal Government intended to cover the entire field⁷ of safety of train operation and to supersede all state regulation.⁸

Assuming that the power of the state has been superseded by the amendment of Section 26, the question is whether the change takes place immediately or at some future date.⁹ In *Smith v. Illinois Bell Tel. Co.*¹⁰ it was contended that, since Congress had granted jurisdiction to the I.C.C. over de-

preciation rates of telephone companies doing an interstate business, the states lost their jurisdiction over depreciation rates. The federal commission had the matter under consideration for many years but had not made a final determination of the rates. The Court denied this contention, saying that "until action has been taken which could be deemed validly to affect the amount to be charged to depreciation" the state retained jurisdiction over these rates. It is difficult to use a similar argument concerning the amendment to Section 26 which we have been discussing. For example, in subsection (b) it is provided that

"block signal systems, interlocking, automatic train stop, train control, and cab-signal devices in use on the date of the enactment of this amendatory provision or such systems or devices hereinafter installed may not be discontinued or materially modified by carriers without approval of the Commission."

This practically "freezes" the present state and carrier regulations pending consent by the I.C.C. While this provision and the other subsections discussed above show that Congress intended that state regulations should be superseded immediately, it might be argued that, since subsection (b) empowers the Commission to order installation of an interlocking device "after investigation, if found in the public interest," the states could order an installation before the I.C.C. finally acts and determines whether to order one. But if the state ordered an installation after the enactment and the I.C.C. later found there was no need for it "in the

Sharfman, *op. cit.*, at page 280 for a description of the enforcement of Sec. 26 up to 1931.

⁶ No attempt has been made to ascertain what states have been regulating these devices. Illinois has promulgated elaborate rules and regulations governing construction, maintenance, and operation of interlocking plants. See General Order No. 6 dated Jan. 1, 1914, since adopted by the present Commission. What appears to be an order of the Wisconsin Commission, probably issued subsequent to the amendment to Sec. 26 of the Interstate Commerce Act and relating to an interlocking plant is *Re Chicago, Mil., St. P. & Pacific R.R. Co.* (2-R-681), summarized in *Public Utilities Fortnightly*, October 14, 1937, p. 510.

⁹ If the federal act becomes effective by its express provisions at a future date, it has been held that state action is superseded at the time of enactment. (*R.R. Com. v. Greyhound*, 92 S.W. (2nd) 296, 15 P.U.R. (N.S.) 504 (1936).)

¹⁰ 282 U.S. 133 (1930); see also *Northwestern Bell v. Nebraska*, 297 U.S. 471 (1936).

⁶ *Napier v. Atlantic Coast Line*, 272 U.S. 605 (1926); *Pa. R.R. Co. v. P.S.C. of Pa.*, 250 U.S. 566 (1919); *Northern Pac. Ry. Co. v. State of Washington*, 222 U.S. 370 (1912); *Staten Island R.T. Ry. Co. v. P.S.C. of N.Y.*, 16 F (2nd) 313 (1926). The amended Section 26 which is part of the Interstate Commerce Act will probably be interpreted like similar terms of the safety acts rather than those in other sections of the Interstate Commerce Act. Most of the safety acts are independent statutes. See *U.S. v. Colorado & N.W. Ry. Co.*, 157 Fed. 321, 330 (1907). In view of the above mentioned cases it is highly probable that the courts will sustain Sec. 26 as amended.

⁷ Prior to the recent amendment Sec. 26 included train-stop, train-control or other safety devices. In *International Great Northern etc. v. Railroad Commission etc.*, 271 S.W. 1084 (1926), *affd. per curiam* 275 U.S. 503, it was held that the states retained jurisdiction over interlocking devices and that the statute related only to devices to prevent collisions on the same track. See

public interest," the I.C.C. could then authorize discontinuance of the device and state regulation would be futile. Furthermore, the proviso in that subsection forbids discontinuance or material modification without consent of the I.C.C. Therefore, any such action by a carrier either voluntary or pursuant to order of the state would subject the carrier to a penalty unless consent of the I.C.C. was first obtained.

Section 26 originally included any "carrier by railroad"; as amended it excludes "any street, interurban, or suburban electric railway unless such railway is operated as a part of a general steam-railroad system of transportation."¹¹ But the fact that Congress did not include these interstate carriers does not mean that they are excluded from all regulation, state and federal. It is highly probable that the courts will hold that the

states retain jurisdiction over these carriers since Congress did not show an intent to free them from state regulation.¹² Thus the states retain jurisdiction over interlocking plants where the tracks of one of these exempt carriers crosses those of another exempt carrier or a purely intrastate line. Where the tracks of one of these exempt carriers crosses those of an interstate steam railroad (or railroad operated by other motive power but part of a general railroad system), the interlocking device would probably be subject to the jurisdiction of the Federal Government.¹³ A more difficult question is what constitutes a "street, interurban or suburban electric railway." This is a question of fact in each case;¹⁴ on that issue there may be some litigation.

A. L. STEIN

*Assistant Counsel,
Illinois Commerce Commission*

¹¹ This exemption is common in many amendments to the Interstate Commerce Act, especially those since the period of federal control. See *U.S. v. Hubbard*, 266 U.S. 474 at 480, footnote 7 (1925).

¹² *Yawkey-Bissel Lumber Co. v. Railroad Commission*, 204 Wis. 210, 235 N.W. 424 (1931).

¹³ *Southern Ry. Co. v. U.S.*, 222 U.S. 20 (1911); *Napier v. Atlantic Coast Line*, 272 U.S. 605 (1926).

¹⁴ *U.S. v. Chicago etc.*, 288 U.S. 1 (1933); 27 *Illinois Law Review* 953; 2 *George Washington Law Review* 107.

Book Review Department

Urban Land

Hough, Henry B. *MARTHA'S VINEYARD: THE STORY OF A SUMMER RESORT, 1835-1935. Edgartown, Mass.: The Author, 1936. pp. 276. \$2.50.*

This charming book, primarily an essay in social history, is earnestly commended to students of land economics. It is one of the most colorful case studies I have seen of the effects of speculative land subdivision on the rise and fall of communities and fortunes. Mr. Hough is editor and proprietor of the *Vineyard Gazette*, now in its ninetieth year; the files of his newspaper have been rich source material. He confesses that one of the motives for writing the book was his irritation with mainlanders who visit the island each summer; see the moors, dunes, and sea, and shake their heads, "If these unimaginative islanders only saw the possibilities of developing the island, what fortunes they could make."

Well, here is the answer. Those very moors, open to wind and sky, were once sold off in lots by imaginative promoters, using the capital of retired whaling captains. The story of the railroad, built in a summer in the eighties, washed out by the sea the next winter, is a tragi-comedy. So is the tale of the parks in Cottage City, shown on the prospectus, built into the physical plan, which turned out upon the liquidation of the developing company to be no parks at all; the promoter's letter to the lot-owners breaking the news to them is a classic. And it all started with religion, a "camp-meeting" which in its heyday brought 30,000 people to the island at once—but read the book.

CHARLES S. ASCHER

Secretary, Committee on Public Administration, Social Science Research Council.

Real Property Inventory of Allegheny County. *Pittsburgh: Bureau of Business Research: University of Pittsburgh, 1937. pp. x, 311. \$5.00.*

This is the second of three related work-relief projects initiated and supervised by the Bureau of Business Research of the University of Pittsburgh. The first study

included data on building lots, voluntary conveyances, mortgages, foreclosures, residential building permits, and demolition permits. This volume gives data on:

1. Residential structures: type, chief construction material, condition, age, presence of basement or garage. The owners' estimate of value is given for owner-occupied homes.
2. Family dwelling units: occupancy or vacancy, rentals, number of rooms, heating, lighting, cooking, bathing, and toilet facilities. Ownership of autos and mechanical refrigeration is also indicated.
3. Occupants and their relation to the dwelling unit: period of occupancy, tenure, race, extra families, number in the family, persons per room, mode of transportation to work, and time spent in going to work.
4. Non-residential units by type: stores, factories, schools, churches, amusement places, etc.

The third study, the Financial Survey of Urban Housing, will be published at a later date. It was also made in conjunction with the Real Property Inventory in February, 1934, and gathered information on the financial aspects of housing for approximately 10% of the families in the urban areas of Allegheny County. Data on family incomes, rents, mortgages, purchase costs, and mortgage and rent delinquencies will appear in this volume to come.

While some of these figures are of value only historically, since they were collected in February, 1934, other items such as the construction material, presence of garage, number of rooms and mode of transportation to work have changed very little, fortunately, over this period. As source books for detailed data on all phases of real estate in this area, they are invaluable to government agencies and business concerns, as well as to real estate men.

CARRIE MAUDE JONES

*Librarian,
National Association
of Real Estate Boards*

Bodfish, Morton, editor. 1936 *BUILDING AND LOAN ANNALS. Chicago: United States Building and Loan League, 1936. pp. xi, 876. \$5.*

The 1936 *Annals* is the seventh in the series of yearly volumes setting forth the activities and progress of savings, building

and loan associations in the United States. These annual compilations are particularly valuable as reflections of what building and loan men are thinking about their business and its relation to current economic and political developments generally, as well as to developments in allied fields of private enterprise.

The scope of the materials contained in the volume is revealed by a glance at some of the topics which appear under the heading "Building and Loan Practice." These include discussions of developments in mutual savings banking, the relation of government to home financing, ratios for analyzing current financial condition, state taxation of savings and loan associations, the trend of current legal decisions, the work of the Federal Savings and Loan Advisory Council, special problems of federal associations, dividend policies, and problems of state supervision.

As usual, the statistical data which the *Annals* presents are among the most valuable materials in the book. This year their usefulness and interest have been still further increased. For the first time the savings and loan balance sheet items have been classified to show comparisons between federal and state-chartered institutions, not only for the current year (1935) but for 1934 as well.

HELEN C. MONCHOW

Of the Journal Staff

Public Utilities

Bonbright, James C. VALUATION OF PROPERTY. New York: McGraw-Hill Book Company, Inc., 1937. 2 vols., pp. xx, 1271. \$12.00.

These two volumes are a distinctive contribution to the border line between law and economics. Some authorities would be inclined to classify them as examples of institutional economics. They represent the results of studies that have been under way at Columbia University for a period of more than 10 years.

The work is divided into three parts—namely, the concepts of value, methods of valuation, and valuation for specific legal purposes. In Part I the author devotes 109 pages to the concepts of value. He has shown that the term, as used in law, has different meanings for different purposes, such as value for rate-making, for taxation, for

condemnation, etc. In his treatment of this phase of the subject, as indeed throughout the entire work, Professor Bonbright is concerned primarily with the problems that confront a court when controversial questions involving property valuation have to be adjudicated. He is rather critical of the concept of value held by the classical economists, because it is impossible to bring all of the notions of value that come before the courts under the concept of value with which the professional economists were concerned.

The opinion of the reviewer is that Professor Bonbright has unduly emphasized what he regards as the weakness of the classical theory of value. The early writers were not concerned with the same problems that have engaged his attention, yet running through his treatment, as well as in the decisions of the courts involving value, there is evidence of a concept of value which has persisted from the writings of the classical economists. It has been necessary to make adjustments of general principles to fit specific situations, but this necessity is not peculiar to economics, even though the adjustments are more pronounced than in the physical and biological sciences.

In the second part of the work the author devotes 157 pages to methods of determining value. After considering the problems of legal "proof" of value, in which he stresses the necessity of more precise definition of the term, he discusses such methods as sale price, original cost, replacement cost, the treatment of depreciation, capitalized income, and capitalized earnings as measures of value. These topics are considered critically in the light of specific issues that require court action.

The balance of the work (well over 1,000 pages) is devoted to valuation for specific legal purposes. Here the author has made his most significant contribution. He has gone into such subjects as the law of damages, measurement of fire losses, eminent domain and indemnity, tax valuation, valuation for rate-making purposes, etc. In the treatment of all the specific purposes, the material is amply supported by references to cases. This material has been handled with great skill and represents an enormous amount of detailed analysis of court cases. Economists, lawyers and appraisers will find in these two volumes a mass of useful information, as well as a thoughtful treatment of the various prob-

lems that the legal valuation of property entails.

FREDERICK S. DEIBLER.

*Professor of Economics,
Northwestern University.*

Brown, George T. *THE GAS LIGHT COMPANY OF BALTIMORE—A STUDY OF NATURAL MONOPOLY.* Baltimore: *The Johns Hopkins Press*, 1936. pp. 112. \$1.

This interesting monograph presents a scholarly and enlightening case study of the first gas company in America from the time of its inception in 1816 to establishment of the Maryland Public Service Commission in 1910. The particular merit of the study is its thoughtful interpretation of carefully selected and annotated historical facts relating to the development of the Baltimore gas company in light of the evolution of public utility control in Maryland.

The author's analysis reveals events which are doubtless characteristic of development of the gas industry and its public control in other states as well. Following the first public demonstration of gas lights in Baltimore in 1802, 14 years of unsuccessful experiments in gas production intervened before the Gas Light Company of Baltimore obtained a franchise from the City. For the next 44 years public policy was to treat the industry like any other business enterprise and to encourage its development, in which the major difficulty, as in all American industry in this period, was to procure the necessary capital. By 1860, however, technological improvements in gas production, which seemed to warrant better service and lower prices than the company offered, together with the company's financial success, had led to public denunciation of monopoly and to public support of competition. Accordingly, in that year Maryland adopted its first regulatory policy by granting a charter to a new gas company, thus deciding that matters of price, service and quality were to be settled by competition. The actual application of this policy was delayed for 10 years, principally by the Civil War, and when competitors finally did appear the results were those characteristic of natural monopolies: first, cut-throat competition (gas wars), then well watered consolidations of those firms able to hold out long enough—with the public always paying the bill, as the study indicates.

Meanwhile, in recognition of the evils of competition in such fields as the gas industry, the theory of natural monopoly was developing, as the author very ably describes. Principally through the writings of Farrar in England, and of Adams and Ely in the United States, the stage was set for a new policy toward public control of utility industries. In Maryland this new form of control was legislative in character and not only recognized the Baltimore gas company as a monopoly but set a maximum price for gas. Dissatisfaction with this method from the standpoint of both price and service, however, resulted on the one hand in attempts to establish a state commission with appropriate jurisdiction as early as 1892, and on the other hand in attempts to promote either municipal regulation or municipal ownership. Nothing came of these attempts until the company's monopoly position was still further entrenched by consolidation with the electric company in 1906, and until New York and Wisconsin had pioneered the way to state commission regulation in 1907. The Baltimore company battled vigorously all bills designed to establish state commission regulation, but its efforts merely provoked public support for such a measure, with the result that the public service commission bill introducing the present-day method of utility control in Maryland was finally enacted in 1910.

D. L. MARLETT

*Assistant to Executive Officer,
Illinois Commerce Commission*

Public Finance

FACING THE TAX PROBLEM. New York: *Twentieth Century Fund*, 1937. pp. xxiii, 606. \$3.00.

This book is a cooperative product involving the direct and indirect collaboration of the trustees of the 20th Century Fund, a Committee on Taxation, and a research staff of 20 workers. It involves considerable original research, much analysis of the tax problem in almost all its phases, and an extended list of conclusions and recommendations by the research staff, supplemented by a separate statement by the Committee on Taxation. It is comprehensive enough to serve as a college textbook on taxation and deserves consideration for that role. A more extended presentation of some of the original research is to appear in a forth-

coming volume entitled *Studies in Current Tax Problems*.

Among the special contributions of an original character are a series of calculations of the yield of the federal income tax under several schedules of rates and with several years' incomes as tax bases; calculation of the relative burden of the existing tax system upon various levels of income under various assumptions concerning the incidence of particular taxes; presentation of quantitative data concerning the stability of different elements in the federal tax system; and calculation of "cost of compliance" (cost to the taxpayer of meeting statutory requirements) in the case of various taxes.

It is impossible here to summarize the more than 100 conclusions of the collaborators. Among the more striking and original conclusions are the following: the excess profits tax should be inaugurated as a permanent part of the tax system, with moderate application for a period during which administration techniques and data concerning capital values are being established; the undistributed earnings feature of the federal corporate income tax and the existing method of treating capital gains and losses should be eliminated in favor of the taxation of such gains with offset for such losses on an annual accrual or inventory basis; in event of failure to adopt this recommendation, alternative means of taxing capital gains are suggested, all of them including a full deduction of capital losses against all incomes; sales taxes are opposed except where clearly necessary for fiscal reasons, and a broadening of the federal income tax base is recommended to reach the smaller incomes; it is calculated that the present tax system will provide adequate revenue before 1940 if present recovery of business continues, but that the states will probably need more revenue than their tax systems will provide in the next few years.

Concerning land and property taxes, the authors oppose the single tax as inequitable to present owners of past increments. However, they favor a tax on future increments at least as a feature of an excess profits tax, and deplore the lack of effort to improve the theory and practice of special assessment taxation. They are skeptical of the wisdom of property tax reduction because of the capitalization of land values and the bonanza to present holders of land that is thought to be involved; if such program is to be ac-

cepted, they recommend consideration of the graded tax plan with a differential assessment favoring improvements as opposed to land. They object to the personal property tax as a poor means of measuring either benefit or ability, and think property tax limitation statutes ill advised.

Among the many treatises on taxation, and particularly those concerned with tax policy, that have appeared in recent years this book is clearly outstanding. Although somewhat technical for the lay reader, it will provide him with a very useful handbook of carefully reasoned analysis concerning tax matters; and to the tax student and expert it should prove indispensable.

HAROLD M. GROVES

*Professor of Economics,
University of Wisconsin.*

HOW SHALL BUSINESS BE TAXED? *New York: Tax Policy League, 1937. pp. vii, 175. \$2.50.*

This symposium is made up of the 12 "formal" papers read at the December, 1936, meeting of the Tax Policy League. It contains articles defining business taxes, discussing the criteria of business taxation, the alleged attitude of business men toward taxation, the types of business taxation employed in Europe, an evaluation of American practices, a discussion of proportional and progressive rates, the New York business tax, and the federal taxes on undistributed profits and payrolls. The contributors are Professors Williamson, Groves, Buehler, Newcomer, Blough, Studenski, Shoup, Rice, and Witte, together with Messrs. Noel Sargent, E. C. Alvord, and George C. Haas. The volume contains a short but well selected bibliography. It has no index and does not include any of the discussion or debate which took place at the conference.

The volume is devoted more to problems arising in the taxation of corporations than to the taxation of business, and thus conforms closely to American practice in this field. It is devoted mainly, too, to how business *is* taxed rather than to how it should be, as might be implied from the title. Corporation and business taxation seems to be assumed. As to whether they should be taxed, the subject is approached indirectly and only incidentally by several of the writers. Some doubts, of course, are cast upon the logic of current practice and some recognition is given of the fact that ability to pay is per-

sonal rather than *in rem*. Yet what is the role of corporate (or business) taxation in a tax system which pretends to be personal in character? What is its proper place in an *in rem* system? And what of the tax burdens on various types of business or types of enterprise—should they be uniform, or should some businesses be taxed more than others? And, while there seems to be considerable sentiment in the book that monopolies should be taxed more than competitive business, how much should the discrimination be and how should the tax be determined? Unfortunately, the reader is unable to find satisfactory answers to many of his questions. None of the papers gives more than incidental mention of the taxation of property employed in business, of the capital stock or corporate excess taxes, of the problems of unit valuation and interstate allocation. Little attention is given to problems of excess profits taxation. The undistributed profits tax comes in for more than its share of the discussion—three essays—in which the “opposition” gets the better of the argument. The defects of the present act are emphasized. It would seem that a better case could have been presented for the incorporation of such a tax (though not precisely the present one) in the fiscal system. Nowhere was the role of the corporation as an avoidance or tax-minimizing device adequately considered. It is, of course, too much to expect that a single meeting of any association could dispose of all of these topics, yet these important gaps in the symposium should be noted.

These limitations in the volume should not obscure the many good points about the collection of essays. It is a welcome addition to the literature. The discussions are interesting, brief, but to the point.

SIMEON E. LELAND

*Professor of Economics,
University of Chicago*

ASSESSMENT PRINCIPLES AND TERMINOLOGY.

Chicago: National Association of Assessing Officials, 1937. pp. viii, 166. \$2.00.

This book, published by the National Association of Assessing Officers, is evidence of sincere thought on the part of its authors to formulate instructions for assessors in

general that will improve the quality of their work. From this standpoint it has merit. The taxpayer too will sympathize with its expressions of desire for better qualifications for assessors and for less political control of these boards.

The ordinary reader, however, cannot escape the impression that it is a plea for more bureaucratic control. Few people, outside of the assessors themselves, will consider as reasonable the suggestion that states generally should enact laws giving assessors the right to obtain lists of depositors from banks. Again few people will sympathize with the assessors in asking for the right to inspect state income tax returns or the right to issue a subpoena and to take testimony under oath “not only from owners of property but from others who have knowledge of taxable property and its value . . . and to require from corporations and individuals copies of balance sheets and income tax returns under penalty. . . .”

“To make general in this country a requirement that all corporations be required to submit annual lists of stockholders and registered bondholders from the record of their holdings” is another plea made by the authors. They ask too for the right to compel national banks, as well as state chartered banks and other lending institutions, to give the assessors access to their records or to make up for the assessors’ use a list of depositors or borrowers on collateral.

The harassed taxpayer who is today bearing the burden of excessive public costs will think this book has quite a limited point of view and, if its recommendations were effected, the difficulties of the average taxpayer would be increased and what little right of privacy is left to him would be diminished.

Trade or professional organizations have a place in our everyday life that is important. Frequently, however, these organizations give every evidence of an intensely selfish attitude with little understanding and with a very narrow concept of the rights of others and the equities of the general situation. This book gives some evidence of that point of view.

MAURICE F. REIDY

Realtor, Worcester, Mass.

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